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Seymour Kent Christensen, Ph.D., Acting Assistant Professor of Marketing.
Walter Leighton Clark III, Ph.D., Assistant Professor of Biochemistry.
Wilson Farnsworth Clark, Ph.D., Assistant Professor of Conservation.
Stewart Lamonte Dallyn, Ph.D., Assistant Professor of Vegetable Crops.
Richard Francis Davis, Ph.D., Acting Assistant Professor of Animal Husbandry.
Robert Dickey, Ph.D., Assistant Professor of Plant Pathology.
Bennett Avery Dominick, Jr., M.S., Assistant Professor of Marketing.
Norman Carl Dondero, Ph.D., Assistant Professor of Bacteriology.
William John Dress, Ph.D., Assistant Professor of Botany.
Howard Ensign Evans, Ph.D., Assistant Professor of Entomology.
William Adolph Feder, Ph.D., Assistant Professor of Plant Pathology.
Richard Bernard Fischer, Ph.D., Assistant Professor of Rural Education.
Robert Hutchinson Foote, Ph.D., Assistant Professor of Animal Husbandry.
William Lee Garman, M.S., Assistant Professor of Agronomy.
Wesley Winnfred Gunkel, M.S., Assistant Professor of Agricultural Engineering.
Lawrence Stanley Hamilton, M.F., Assistant Professor of Forestry.
Alvin Russell Hamson, B.S., Assistant Professor of Vegetable Crops.
Francis M. R. Isenberg, Ph.D., Assistant Professor of Vegetable Crops and Pomology.
William Kirby Jordan, Ph.D., Assistant Professor of Dairy Industry.
Steven Clarence King, Ph.D., Assistant Professor of Animal Genetics and Poultry Husbandry.
Richard Paul Korf, Ph.D., Assistant Professor of Plant Pathology.
William Rudolph Kunsela, Ph.D., Assistant Professor of Rural Education.
Lawrence William Larson, M.S., Assistant Professor of Agricultural Engineering.
Douglas J. Lathwell, Ph.D., Assistant Professor of Soil Science.
Robert Edwin Lee, Ph.D., Assistant Professor of Floriculture.
Gilbert Levine, Ph.D., Assistant Professor of Agricultural Engineering.
Carl Clifford Lowe, Ph.D., Assistant Professor of Plant Breeding.
Richard Pell March, M.S., Assistant Professor of Dairy Industry.
Everett Donald Markwardt, M.S.A., Assistant Professor of Agricultural Engineering.
Russell Dickinson Martin, M.S., Assistant Professor of Extension Teaching.

Dewey Edward McNiece, B.S., Assistant Professor of Poultry Husbandry.
William Frederick Millier, Ph.D., Assistant Professor of Agricultural Engineering.
Robert Rising Morrow, Jr., Ph.D., Assistant Professor of Forestry.
John Adam Naegele, Ph.D., Assistant Professor of Entomology.
Hugh Donald Naumann, Ph.D., Assistant Professor of Animal Husbandry.
Daniel Altman Roberts, Ph.D., Assistant Professor of Plant Pathology.
Kenneth Leon Robinson, M.S.A., Assistant Professor of Agricultural Economics.
Richard Leander Sawyer, Ph.D., Assistant Professor of Vegetable Crops.
Edward Arthur Schano, B.S., Assistant Professor of Poultry Husbandry.
Ben Edward Sheffy, Ph.D., Assistant Professor of Animal Husbandry.
Samuel Thomas Slack, Ph.D., Assistant Professor of Animal Husbandry.
James Wendell Spencer, M.C.E., Assistant Professor of Agricultural Engineering.
Bernard Freeland Stanton, Ph.D., Assistant Professor of Farm Management.
Earl Lewis Stone, Jr., Ph.D., Charles Lathrop Pack Assistant Professor of Forest Soils.
Robert Prindle Story, Ph.D., Assistant Professor of Marketing.
John Fanning Thompson, Ph.D., Assistant Professor of Botany.
Paul John VanDemark, Ph.D., Assistant Professor of Bacteriology.
Richard Griswold Warner, Ph.D., Assistant Professor of Animal Husbandry.
James R. White, D.Ed., Assistant Professor of Rural Sociology.
Thomas Edgar Wiley, M.S., Assistant Professor of Animal Husbandry.
Charles Edward Williamson, Ph.D., Assistant Professor of Plant Pathology.

INSTRUCTORS

Ethel Zoe Bailey, A.B., Curator, Bailey Hortorium.
Harold Clough, Instructor in Agricultural Engineering.
Earl William Crane, B.S., Instructor in Rural Education.
James Edwin Cruise, M.S., Instructor in Botany.
Robert Charles Curtis, A.B., Instructor in Meteorology.
Raymond Thomas Fox, M.S., Instructor in Floriculture.
Mrs. Vera Hakanson Fox, B.S., Instructor in Drawing.
Ronald Bay Furry, B.S., Acting Instructor in Agricultural Engineering.
Arthur Edward Hiltbold, M.S., Instructor in Agronomy.
Robert John Lambert, M.S., Instructor in Freehand Drawing.
Francis Asbury Lueder, Jr., B.S., Instructor in Extension Teaching.
Conrad Frederick Meyer, M.S., Instructor in Botany.
Harold Leslie Noakes, Ph.D., Instructor in Agricultural Education.
Levi Wayland Parker, M.S., Instructor in Agricultural Geography.
Theodore Dwight Richards, Jr., M.S., Instructor in Extension Teaching and Information.
Ernest Frederick Schaufler, M.S.A., Instructor in Floriculture and Ornamental Horticulture.
Bernice Margaret Scott, B.S.M., Instructor in Rural Sociology.

STAFF OF THE EXPERIMENT STATION AT GENEVA

PROFESSORS

John Carlton Cain, Ph.D., Professor of Pomology.
Paul Jones Chapman, Ph.D., Professor of Entomology.
Ralph Willard Dean, Ph.D., Professor of Entomology.
John Einset, Ph.D., Professor of Pomology.
James Morton Hamilton, Ph.D., Professor of Plant Pathology.
David Birney Hand, Ph.D., Professor of Biochemistry.†

†On leave fall term.

George Edward Romaine Hervey, Ph.D., Professor of Entomology.
George James Hucker, Ph.D., Professor of Bacteriology.
Zoltan Imre Kertesz, Ph.D., Professor of Chemistry.
James Douglass Luckett, M.S., Professor and Editor.
DeForest Harold Palmiter, Ph.D., Professor of Plant Pathology.
Carl Severin Pederson, Ph.D., Professor of Bacteriology.
Charles Bovett Sayre, M.S., Professor of Vegetable Crops.
Wilbur Theodore Schroeder, Ph.D., Professor of Plant Pathology.
Nelson Jacob Shaulis, Ph.D., Professor of Pomology.
George Lewis Slate, M.A., Professor of Pomology.

ASSOCIATE PROFESSORS

James Alfred Adams, Ph.D., Associate Professor of Entomology.
Lester Curtis Anderson, B.S., Associate Professor of Pomology.
Alfred Williams Avens, Ph.D., Associate Professor of Chemistry.
Donald Wilber Barton, Ph.D., Associate Professor of Vegetable Crops.
Frank Paul Boyle, Jr., Ph.D., Associate Professor of Biochemistry.
Alvin Joseph Braun, Ph.D., Associate Professor of Plant Pathology.
Benjamin Edward Clark, Ph.D., Associate Professor of Seed Investigations.
Willard Francis Crosier, Ph.D., Associate Professor of Seed Investigations.
Otis Freeman Curtis, Jr., Ph.D., Associate Professor of Pomology.
Foster Lee Gambrell, Ph.D., Associate Professor of Entomology.
Edward Hadley Glass, Ph.D., Associate Professor of Entomology.
James Davis Harlan, B.S., Associate Professor of Pomology.
James Courtenay Hening, M.S., Associate Professor of Chemistry.
Alvin William Hofer, Ph.D., Associate Professor of Bacteriology.
Robert William Holley, Ph.D., Associate Professor of Organic Chemistry.
George Henry Howe, B.S., Associate Professor of Pomology.
Frank Andrew Lee, Ph.D., Associate Professor of Chemistry.
Siegfried Eric Lienk, Ph.D., Associate Professor of Entomology.
Guilford Leroy Mack, Ph.D., Associate Professor of Chemistry.
James Charles Moyer, Ph.D., Associate Professor of Chemistry.
Frederick George Mundinger, M.S., Associate Professor of Entomology.
Willard Bancroft Robinson, Ph.D., Associate Professor of Chemistry.
Edward Holman Smith, Ph.D., Associate Professor of Entomology.
William Thorpe Tapley, M.S., Associate Professor of Vegetable Crops.
Emil Frederick Taschenburg, Ph.D., Associate Professor of Entomology.
Morrell Thayer Vittum, Ph.D., Associate Professor of Vegetable Crops.
Austin Clayton Wagenknecht, Ph.D., Associate Professor of Biochemistry.

ASSISTANT PROFESSORS

John Dwain Atkin, Ph.D., Assistant Professor of Vegetable Crops.
Karl Dietrich Brase, M.S., Assistant Professor of Pomology.
Alexander Cochran Davis, Ph.D., Assistant Professor of Entomology.
Robert McCullough Gilmer, Ph.D., Assistant Professor of Plant Pathology.
Robert Consay Lamb, M.S., Assistant Professor of Pomology.
John Jacob Natti, Ph.D., Assistant Professor of Plant Pathology.
LeRoy Walter Nittler, Assistant Professor of Seed Investigations.
Ernest Sondheimer, Ph.D., Assistant Professor of Chemistry.
Keith Hartley Steinkraus, Ph.D., Assistant Professor of Bacteriology.
Michael Szkolnik, Ph.D., Assistant Professor of Plant Pathology.
Roger Darlington Way, Ph.D., Assistant Professor of Pomology.
Donald Ellsworth Wilson, Ph.D., Assistant Professor of Food Science.

The New York State College of Agriculture

CORNELL UNIVERSITY, the Land-Grant institution for New York State, was chartered by the Legislature in 1865. By the terms of the Land-Grant Act of 1862, teaching in agriculture has been, from the beginning, a regular part of the university program. In 1904 the Legislature of the State of New York established the College of Agriculture as a state institution under the title "The New York State College of Agriculture at Cornell University," and made an appropriation for the erection of buildings for the College. In 1906 the Legislature passed an Administration Act defining the purpose and activities of the College of Agriculture thus: "The object of said college of agriculture shall be to improve the agricultural methods of the state; to develop the agricultural resources of the state in the production of crops of all kinds, in the rearing and breeding of livestock, in the manufacture of dairy and other products, in determining better methods of handling and marketing such products, and in other ways; and to increase intelligence and elevate the standards of living in the rural districts. For the attainment of these objects the college is authorized to give instruction in the sciences, arts and practices relating thereto, in such courses and in such manner as shall best serve the interests of the state; to conduct extension work in disseminating agricultural knowledge throughout the state by means of experiments and demonstrations on farms and gardens, investigations of the economic and social status of agriculture, lectures, publication of bulletins and reports, and in such other ways as may be deemed advisable in the furtherance of the aforesaid objects; to make researches in the physical, chemical, biological and other problems of agriculture, the application of such investigations to the agriculture of New York, and the publication of the results thereof."

With the creation of the State University of New York in 1948, the College of Agriculture, as one of the four state-supported units at Cornell University, became an integral part of this new State University. "Created to provide a comprehensive and adequate program of higher education" the State University now includes more than thirty educational institutions. The College of Agriculture, functioning in this broad context, offers teaching and research facilities to serve the agricultural needs of the State.

THE COURSES AVAILABLE

The resident instruction in the College of Agriculture is planned for those who desire training in agriculture and in the sciences most closely related to agriculture. It is organized, for the most part, in a course of four years, or eight terms, leading to the degree of Bachelor of Science. Those who want instruction in a special field may register for one or more terms as special students, provided they are qualified by education and experience to pursue the courses they want to take (see page 24).

For those who cannot plan to take four years of college work, special curricula are organized, running through two years, to give specific training for definite vocational objectives. Transfer from the two-year to the four-year course is possible under certain conditions which are described in the Announcement of the two-year course.

Graduate work in the various fields of agriculture is under the jurisdiction of the Graduate School of Cornell University to which questions about admissions should be addressed.

Aside from the above, there is regularly a six-week summer school designed especially for teachers, school principals, and superintendents.

There are also one-week and two-week courses with specific purposes. Correspondence courses, without credit toward a degree, are available.

The information contained in this Announcement applies specifically to the four-year course. Circulars describing the other courses referred to may be obtained on application to the Secretary of the College.

THE FOUR-YEAR COURSE

Of all the vocations, agriculture is the largest and one of the most important in the world. It encompasses not only farming but a wide range of related services that offer, and will continue to offer, challenging opportunities to young people of ability. Such young men and women, of proper background and ability, no matter whether their interests center in farming, in commercial enterprise, in science and experimentation, or in education, may find them all represented in agriculture.

Farming, the basic occupation in the vast agricultural industry, attracts those who enjoy operating their own businesses, working with their own hands in the production of crops and animals, and managing capital and a small amount of labor.

Services to farmers are many and varied. To visualize them as fields of vocational interest for young people, it may help to think of them as falling in three classifications. First are those of a *commercial* nature, including the buying, selling, transportation, storage, processing, manu-

facturing, advertising, and financing that are necessary to make the products of the farms available for human use in a great variety of forms. Of similar type are the many enterprises that produce the machinery and other equipment, the feed, fertilizer, spray materials, and other supplies that the farmer uses in his business. Second, there are services of a *developmental* nature, meaning the experimental work of scientists to develop a better understanding of our soils, plants, animals, and the products that are derived from them, and of human relations. It is through the learning of new truths and their application to the affairs of agriculture that improvements are made. Agriculture, broadly interpreted, presents a challenge and an opportunity to the best scientific ability. And, finally, there are *educational* services. The teaching of vocational agriculture in our high schools, the dissemination of agricultural information through the various agencies of the Agricultural Extension Service, including the radio and the press, and the instruction of students at our agricultural institutes and colleges of agriculture are all services of an educational nature. They provide an unusual range of opportunities for those who are interested in educational work.

The New York State College of Agriculture, in its program of instruction, recognizes the diversity of agriculture and the range of vocational and professional opportunities that have developed under the stimulus of scientific research. To meet this situation, the requirements for graduation from the College are extremely flexible as they apply to an individual student. The purpose is to permit each student to acquire a breadth of vision, combined with the necessary technical qualifications, that his objective requires. The College does not outline and publish a separate curriculum for each vocation, but within broad limits each student may work out, in cooperation with a competent faculty adviser, a program of courses that meets his individual, or personal, situation.

The following description of employment opportunities that are open to graduates of the College includes those in which former graduates have engaged as well as some of the more recent fields of employment that have resulted from new developments in the agricultural industry or from within the College itself. They suggest some of the major types of instruction that are available at the College.

A long list of specific occupations that graduates of the College have found available could be included, but that has not been done because experience shows that the objectives of students should not be too narrow, at least in the beginning. The intention is to point out some of the important and broad fields of agriculture for which the College offers training and in which graduates have found satisfactory opportunities for employment. Many different types of training and employment that represent a range of interests and qualifications are described. They may extend from strictly commercial business in agri-

culture to the highly specialized sciences in which the opportunity for service and reward are the equal of any to be found. Government service, private business, large corporations, and cooperative enterprise all are represented.

FARMING...A first responsibility of the College is to the young men who plan to enter farming. A good living at satisfying work and an opportunity to contribute to community life await the graduates with the necessary farm experience and enough capital to operate a desirable farm. These young men take a general course in agriculture, with emphasis on the type of farming they plan to follow. A general course likewise fills the needs of others who may enter related fields until they have enough capital to buy or rent a farm. The important types of farming in New York State are dairy, livestock, poultry, fruit, vegetable, and general, with a small number of farms concentrating on other products because of special interests or special markets.

BUSINESS AND INDUSTRY...Business and industry are calling more and more upon competent young persons with agricultural training, especially those businesses that market farm products and purchase and handle farm supplies.

The food industry is the most important agricultural business in New York State. It is made up of units of all sizes and types, from small, individually owned establishments to some of our largest corporations and cooperatives. Of the various foods that make up the industry, milk with its products is the largest both in dollars and in the number of persons employed. The College works closely with the dairy industry in its instructional and research programs. The perishable nature of milk makes it imperative that the latest scientific methods be used in its manufacture and distribution. This creates a demand for men with technical and scientific training both in the handling of milk and in the manufacture and distribution of such milk products as ice cream, butter, dry milk, and cheese. Since many who start in the dairy industry will eventually have managerial or administrative duties, the training, in addition to the basic sciences and technical subjects in dairy industry, may include courses in marketing, accounting, economics, psychology, sociology, and personnel administration. Graduates are also sought in such related industries as poultry and egg marketing and meat packing.

A committee of the New York State Canners and Freezers Association, Incorporated, has cooperated with the College in the establishment of a special program of instruction in the canning, preservation, freezing, and dehydration of fruits and vegetables. The Association will help to find summer employment for interested students as well as more permanent positions for them after graduation. Since the Associ-

ation seeks young men who will eventually become managers, training is designed to prepare students for plant, field, office, or sales work.

The business of supplying feed for New York dairy cattle and poultry is of major importance. It requires men who know New York agriculture and, more particularly, who know feeds and the feed requirements of the various types of livestock. The production and the delivery of the right fertilizers, machinery, insecticides, and fungicides, and all other supplies used on our farms, require the services of qualified men. They may need to be well-trained scientists, technicians, salesmen, promotional specialists, or plant operators, or to serve eventually as managers or in other administrative capacities.

All of these businesses and many others in agriculture require a knowledge of financing, advertising, insurance, and other specialized services. Credit organizations, both private and governmental, advertising concerns, and insurance companies have employed graduates of the College. Farm-loan representatives have been employed by local banks, insurance companies, and the various branches of the Farm Credit Administration. Farm experience and the ability to work with people are valuable assets as qualifications for employment, along with a general training in agriculture, including agricultural economics.

The production and sale of flowers and ornamental shrubs in New York is an important and large business. Many students who specialize in floriculture and ornamental horticulture are sons and daughters of persons in the greenhouse or nursery business. Others who do not have that background but combine practical experience with their training find satisfactory opportunities upon graduation.

The College does not have a school of journalism, but it offers several courses in agricultural journalism, visual aids, and farm radio writing and broadcasting. Job opportunities include editorial and staff positions on newspapers, farm papers, and farm magazines. In radio, agricultural college graduates occupy positions as farm program directors and farm news writers for radio services in the state colleges throughout the Nation.

HIGH SCHOOL TEACHING. . . There is continuing need for young men qualified to teach agriculture in the high schools of the State. During the ten-year period prior to World War II, there was a rapid increase in the number of high-school departments of agriculture in New York State, and one of each five graduates of the College became a teacher of vocational agriculture. With the advent of the war, both teachers and students in training entered the armed services. This forced many high schools to discontinue the teaching of agriculture. Others were compelled to employ, on a temporary basis, teachers who did not meet fully the certification requirements of the State Education Department. Young men who wish to enter this profession need

an extensive background of practical farm experience. In college, they pursue a general course in agriculture including the technical and professional courses required for certification by the State Education Department. Many good teachers of agriculture have gone on to better teaching positions in the agricultural institutes of the State and to good jobs elsewhere. The experiences gained through teaching have qualified a number of successful teachers of agriculture for important positions with business organizations.

Graduates of the College of Agriculture also find positions as science teachers in high schools. To qualify for this work, students need courses in the physical and biological sciences and mathematics, in related courses in agriculture, and in professional courses in education required by the State Education Department.

AGRICULTURAL RESEARCH AND HIGHER EDUCATION... Preparation for careers in agricultural research and higher education usually involves graduate study beyond the four-year course in agriculture leading to the Degree of Bachelor of Science. Graduates of the College of Agriculture with superior records and sound background in basic subject matter usually are accepted as graduate students in the institutions of their choice. They frequently qualify for fellowships or assistantships which help to defray the costs of graduate study. Curricula which emphasize preparation for advanced study can be worked out with undergraduate advisers.

AGRICULTURAL EXTENSION SERVICE...The Extension Services in 56 counties of the State offer a gratifying future to men who would like to work with farmers and young people in furthering agriculture in the State. Each year agricultural graduates with adequate farm experience leave the College to become assistant county agricultural agents or 4-H club agents.

WILDLIFE CONSERVATION...Opportunities in the conservation and management of fish and wildlife are found principally in public employment, with either the state or federal government. Occasionally, there are openings with museums and private foundations. The training in college emphasizes the biological sciences. The work is likely to consist chiefly of survey and research, but in recent years many management and administrative positions have been established. As such, the work is exacting but of great interest to those scientists with a desire to develop and conserve our wildlife resources and to help the people to understand them. The Department of Conservation at the College has printed material on training and employment opportunities in this field.

SOCIAL SERVICE...Another appeal for graduates of the College who have specialized in rural sociology is in the field of social service.

The Department of Rural Sociology cooperates with the State Department of Social Welfare as well as with other governmental agencies. The College does not prepare students for positions in social service which require professional or graduate training, but it does provide pre-professional instruction. Qualified graduates have received through the State Department of Social Welfare fellowships for training in rural child welfare.

FOREIGN SERVICE...The international situation is such that the Federal Government provides opportunities in foreign service for qualified graduates of the College of Agriculture. These may be in either the Office of Foreign Agricultural Relations in the Department of Agriculture or in the Department of State. As the program of the federal government to extend our technical knowledge to less-developed countries expands, the demand for agricultural college graduates, with the proper training in agricultural science and in historical backgrounds of the people of the countries where the program operates, will increase. Commercial concerns in the business of importing or exporting agricultural products or supplies also employ graduates of the College. These opportunities, of course, are limited.

STATE AND FEDERAL CIVIL SERVICE...Several agricultural agencies, both state and federal, employ their personnel from registers established by the New York State Department of Civil Service or the United States Civil Service Commission. Positions with these organizations may be of a research, extension, regulatory, or administrative nature. To gain a place on Civil Service registers, seniors or graduates take the appropriate examinations which are announced from time to time, some of them annually.

DIRECTIONS REGARDING CORRESPONDENCE

For admission to the freshman class, to the two-year courses, or to advanced standing from other colleges and universities, all communications should be addressed to the Director of Admissions of Cornell University, Edmund Ezra Day Hall.

For enrollment in correspondence courses, communications may be addressed to the Supervisor of Study Courses in the College of Agriculture, Roberts Hall.

For admission to graduate work in agriculture and candidacy for advanced degrees, communications should be addressed to the Dean of the Graduate School, Edmund Ezra Day Hall.

The *General Information* booklet, giving details concerning admission, expenses, scholarships, and related subjects, may be obtained by writing to Cornell University Official Publication, Edmund Ezra Day Hall. Announcements of the other colleges, schools, and departments

of the University may also be obtained by writing the Official Publication office.

THE APPLICATION FOR ADMISSION

Admission to the College is not simply a matter of presenting certain specified entrance units. For both the applicant and the College it is of the utmost concern that a proper choice of college work be made, and the College, therefore, in making its choice of students to be admitted, considers not only the school record submitted but also any other available indications of probable success in the course the student proposes to take. For this reason the applicant should give, in addition to his formal school credentials, the fullest information regarding his background and experience, the quality of his work, his resources for carrying on and his own purposes in seeking a college education, so that the College may have a better basis for consultation and decision. Correspondence regarding these matters is solicited, and, if it is at all possible, applicants should come to the College for an interview.

Prospective students who have neither lived on farms nor had considerable practical experience in agriculture are urged to spend at least one year on a well-managed farm to familiarize themselves with common farm affairs and operation before entering College. This experience will count toward the requirement in practice which is described on pages 24 to 26.

Every candidate for matriculation must submit to the Director of Admissions a satisfactory certificate of vaccination against smallpox, not later than August 1 if he is to be admitted in September, or not later than January 1 if he is to be admitted in February. It is accepted as satisfactory only if it certifies that within the past five years a successful vaccination has been performed or three unsuccessful attempts at vaccination have been made. (For other health requirements, see the *General Information* booklet.)

Candidates for admission to the four-year course must be at least sixteen years of age. Students from other colleges or universities are required to furnish certificates of honorable dismissal from those institutions. The academic requirements may be satisfied by the presentation of New York State Regents credentials, or acceptable school certificates, or satisfactory ratings in the tests of the College Entrance Examination Board. Candidates who have prepared for college in New York State should offer a report of State Regents Examinations in subjects which are offered for entrance credit and in which Regents Examinations are scheduled at their schools.

Candidates for admission must file their applications and credentials at the office of the Director of Admissions, Edmund Ezra Day Hall. They should be filed during the fall term of the senior year in high

school. Applications received after April 1 will probably be at a disadvantage and ordinarily will not be accepted after June 1.

ENTRANCE REQUIREMENTS FOR THE FOUR-YEAR COURSE

The subjects that may be offered for admission to the College of Agriculture are named in the following list; the figures following each subject indicate the value in entrance units and show the maximum and the minimum amount of credit allowed in the subject. A unit represents five recitations a week for one year in a subject. In Drawing and Industrial Arts, 240 hours are required to earn one unit and 120 hours to earn one-half unit.

ENGLISH, 4 YEARS (required of all entering students) 4

FOREIGN LANGUAGES (modern and ancient)

French, first to fourth year 1, 2, 3, 4
German, first to fourth year 1, 2, 3, 4
Hebrew, 1, 2, 3
Italian, first to third year 1, 2, 3
Spanish, first to fourth year 1, 2, 3, 4
Greek, first to third year 1, 2, 3
Latin, first to fourth year 1, 2, 3, 4

(If a foreign language is offered for entrance, it is desirable to present at least two years, although credit will be granted for a single year of study in not more than two languages.)

MATHEMATICS

Elementary Algebra 1
Intermediate Algebra 1
Advanced Algebra ..... ½
Plane Geometry 1
Solid Geometry ..... ½
Plane Trigonometry ..... ½

SCIENCES

Biology 1
Botany ½–1
Chemistry 1
General Science 1
Physical Geography ½–1
Physics 1
Zoology ½–1

(If a unit in Biology is offered, a half-unit in Botany and a half-unit in Zoology may not also be counted.)

SOCIAL STUDIES, including History (each course) ½–1

VOCATIONAL SUBJECTS

Agriculture ½–7
Bookkeeping ½–1
Drawing ½–1
Home Economics ½–6
Industrial Arts ½–1

ELECTIVES– any high school subject or subjects not already used and acceptable to the University ½–2

For admission to the New York State College of Agriculture, an applicant must have completed a secondary-school course and must offer either A or B, as follows:

A. Sixteen units which must include English (4 units) and mathematics (2 units). The remaining units must be selected from the above list.

B. The New York State Vocational Diploma in Agriculture, with the proviso that two units in mathematics are included.

A committee on admissions in the College of Agriculture reviews the credentials of each applicant. In making its decision the committee considers not only the nature of the subjects offered for admission and the quality of the work done in those subjects, all available indications of ability for and interest in the work of the course to be undertaken in the College, but the background, experience, character, and personality of the applicant. When it is considered advisable, the committee may require an applicant to take the Scholastic Aptitude Test of the College Entrance Examination Board.

Prospective students who wish to major in one of the sciences or to become research workers should offer adequate training in foreign languages.

ADMISSION WITH ADVANCED STANDING

A student admitted to the College of Agriculture from another college in Cornell University, or from any other institution of collegiate rank, is regarded as having completed the number of terms and hours to which his records entitle him and receives all the privileges of students who have completed the same number of terms and hours by residence in the College. No more than fifteen semester hours of credit are allowed for one semester of work at another institution. To obtain the degree of Bachelor of Science, however, a student must have completed the prescribed subjects in the four-year course and the requisite number of elective hours in agricultural subjects. He must also have been in residence in the College of Agriculture for his past two terms and have completed not less than fifteen hours a term, of which two-thirds, at least, must be subjects taught by the staff of the College of Agriculture. Because advanced-standing credit may reduce the number of summers available for farm work after admission, these applicants are ordinarily held to satisfy a part or all of the practice requirement at entrance, depending upon the number of terms of residence for which they are held.

Credit toward a degree for work done in a preparatory school on subjects that may be offered for entrance to the University is given only to those students who, in addition to satisfying all entrance requirements, pass separate examinations in the subjects for which they seek college credit. These examinations cover substantially the same ground as the university courses in the subject. An applicant desiring a college-credit examination of this kind must apply to the Office of Admissions as early as possible, and in no case later than the day of registration, specifying which sixteen units he intends to offer in satisfaction of the entrance requirements, and on what other entrance subjects he wishes to be examined for credit. If he fails to satisfy the entrance requirements in any

one or more of the units on which he proposes to enter, but passes the credit examination in any other subject or subjects, he may use the latter toward satisfying entrance requirement, but in that case he cannot also receive college credit for such subject or subjects.

A student who receives at entrance twelve or more hours of credit in addition to the requirements for admission may be regarded as having satisfied one term of residence. Under no circumstances is surplus entrance credit based on extra work done in preparatory school accepted as the equivalent of more than one term.

REQUIREMENTS FOR ADMISSION OF SPECIAL STUDENTS

Opportunity is provided for the admission of students whose needs may not be well met by the organized curricula of the College. Applicants for admission to such special standing must present entrance credentials as other students do, and in addition they must present a detailed statement of the program they desire to follow. They must show that they have had recent farm experience or other experience qualifying them for the special work they plan to do, and, unless they offer regular entrance, they must be twenty-one years of age.

Students having a first degree and desiring further undergraduate work may be admitted as special students. The work of such students is ordinarily limited to courses in the College of Agriculture; for work taken outside, tuition is charged at the rate prevailing in the college where the work is done.

REQUIREMENTS FOR THE DEGREE OF BACHELOR OF SCIENCE

The requirements for the degree of Bachelor of Science are residence for eight terms, except for those who make an average of 75 or above, and, in addition to the prescribed work in Military Training and in Physical Training (outlined on page 97 and completely described in the *Announcement of the Independent Divisions and Departments),* the completion of 120 hours of required and elective work, as outlined on page 26.

Freshmen are required to attend, during their first term, a course designed to orient students in the life of the University and specifically to acquaint them with the scope and purpose of the courses of instruction in the College. The course meets once a week and carries one hour of credit.

THE PRACTICE REQUIREMENT

All men students must satisfy a practice requirement. The purpose is to make certain that they shall have learned some of the skills and practices in farming or other occupations for which they are preparing and shall have gained some understanding of the related economic and social conditions that prevail, particularly with respect to farming.

Credit toward meeting the requirement is measured in points which must be obtained according to the following schedule:

A minimum of twelve points required for registration in the sophomore year, all of which shall be earned from experience on a farm.

A minimum of twenty-four points required for registration in the junior year.

A minimum of forty points required for registration in the senior year. Credit is given for work done prior to college entrance and during vacations after matriculation. Many students satisfy the full requirement at entrance because of having lived and worked on a farm and others because of a combination of farm and other work experience that is acceptable in their specialization.

Prospective students who have not had considerable practical experience in farming or in their intended field of specialization are urged to take advantage of every opportunity to gain such experience before entrance to college, even to the extent of spending a full year between high school and college in that way. The experience furnishes a background for much of the college instruction. Practice credit after entrance may normally be expected at the rate of about one point a week for satisfactory work. The amount of credit is based on the nature and variety of work done and what was learned from the experience.

Since regular NROTC students are required to spend from six to eight weeks each summer on cruises or in aviation training, it is necessary for those who register in the College of Agriculture to satisfy a major part of the practice requirement at the time of admission. This should ordinarily amount to not less than 25 of the required 40 points of practice credit. Contract students should have no difficulty in finding time to satisfy the practice requirement and also take the required cruise. (See the *Announcement of the Independent Divisions and Departments* for information about NROTC.)

Credit toward the practice requirement is given for work on a farm. In addition, students specializing in bacteriology, biochemistry, botany, dairy industry, entomology, floriculture and ornamental horticulture, food industry, nutrition, rural sociology, wildlife conservation, or zoology may be given credit for work in these fields, as follows:

Students desiring to specialize in bacteriology, botany, dairy industry, food industry, nutrition, wildlife conservation, and zoology shall obtain a minimum of one-third, and those specializing in biochemistry and rural sociology a minimum of two-thirds, of their practice credit from farm work. Upon their acceptance as specializing students and with the approval of the designated adviser for the specialization and of the Farm Practice Office, they may then complete the practice requirement by approved work in their field of specialization.

The practice requirement for students specializing in floriculture and

ornamental horticulture applies to both men and women. For these students, production work in greenhouses and nurseries may count toward satisfaction of the twelve points of credit required from farm work. The Department requires at least twenty points of credit from work in floriculture or ornamental horticulture.

Students specializing in entomology must obtain the twelve points of credit from farm work required of all students for admission to the sophomore year; sixteen points from entomological practice.

All students who are specializing in one of the fields listed and who expect to use work in their specialization to satisfy a part of the practice requirement must consult the adviser concerned with regard to course and other requirements for acceptance as specializing students. Students are held for farm work to meet the practice requirement until the adviser for the specialized program officially notifies the Farm Practice Office and the Office of Resident Instruction of their acceptance as specializing students. After matriculation any additional farm experience that is required must precede the specialized experience.

The practice requirement applies to male alien students just as it does to citizens of the United States, except that male aliens who matriculated before September, 1950, are held only for a requirement of twelve points of practice credit which must be obtained from farm work in this country. Those aliens who matriculated in September, 1950, and those who matriculate subsequently must meet the regular practice schedule as described for all male students.

Prospective students and students who desire information about any aspect of the practice requirement or want assistance in finding employment on a farm should write or consult Professor S. R. Shapley, Farm Practice Office, Roberts Hall, Ithaca, New York. The Department concerned assists in finding employment for the specialized practice.

THE COURSES LEADING TO THE DEGREE OF BACHELOR OF SCIENCE

(Required courses given in other colleges than Agriculture are described in the *Announcement of the College of Arts and Sciences.)*

Freshman Orientation Course 1
English, Introductory Course 6
Botany, Biology, or Zoology 6
Chemistry or Physics 6
Geology 115 (the requirement may be waived for students presenting geology or earth science for entrance; in such a case 3 hours are added to the minimum agricultural electives) 3
Basic sciences and social studies 24
(Not less than 9 hours and not less than 2 subjects under A and not less than 9 hours and 2 of the 4 subjects under B)

A. Biology, botany, zoology, entomology, bacteriology, physiology, genetics, psychology, chemistry, physics, geology, physical geography, mathematics, meteorology, human growth and development, and biochemistry.

B. (1) Economics, (2) government, (3) history, (4) rural sociology, sociology and anthropology, and the interdepartmental course in social science, except that courses under these headings in accounting and statistics may not be used.

Elective in the College of Agriculture (including any courses listed in this *Announcement* on pages 37 to 97, with exceptions specifically noted) 54

Elective (either in Agriculture or in any other college in the University) 20

Total 120

Students who do not present chemistry for entrance are required to take chemistry.

Students who do not present physics for entrance are required to take physics.

All physically qualified undergraduate men who are American citizens must take military training during their first four terms. Enrollment in the basic course of Military Science and Tactics or Air Science and Tactics, or in the first two years of Naval Science, satisfies this requirement. Students transferring to Cornell from other institutions are exempt from part or all of the requirement, according to the number of terms of residence in college before transfer, and service in the armed forces in World War II also satisfies the military training obligation. Entering students who have had ROTC training in secondary or military schools are requested to bring WD AGO Form 131 — Student's Record for presentation to the Military Department at the time of registration. (See also the *Announcement of the Independent Divisions and Departments.)*

Credit either in the Basic Course in Military or Air Science and Tactics (four terms), or in the first four terms of Naval Science, does not count toward the 120 hours required for graduation in the College of Agriculture.

All undergraduates must pursue four terms of work, three hours a week, in Physical Training. Ordinarily, this requirement must be completed in the first two years of residence; postponement is to be allowed only by consent of the University Faculty Committee on Requirements for Graduation. Exemption from this requirement may be made by the Committee when it is recommended by the medical office, by the Department of Physical Education, or because of unusual conditions of age, residence, or outside responsibilities. An exemption recommended by the Department of Physical Education shall be given only to stu-

dents who meet standards of physical condition established by the Department of Physical Education and approved by the Committee on Requirements for Graduation. Students who have been discharged from the armed services may be exempted.

For students entering with advanced standing, the number of terms of Physical Training required is to be reduced by the number of terms which the student has satisfactorily completed (whether or not Physical Training was included in his program) in a college of recognized standing (see the *Announcement of the Independent Divisions and Departments.)*

BACHELOR OF SCIENCE WITH DISTINCTION

The degree of Bachelor of Science with distinction will be conferred upon those students who, in addition to having completed all the requirements for the Bachelor of Science degree, shall have done all of their undergraduate work at Cornell University and have cumulative scholastic averages of 85 or above; and upon those transfer students who have been in residence for at least two years and have cumulative averages of 88 or above.

REGISTRATION FOR COURSES

The standard schedule for the freshman year must include the following courses:

Freshman Orientation Course	1
Military Training	0
Physical Training	0
English, Introductory Course	6
Botany 1, Biology 1, or Zoology 103 and 104	6
Chemistry or Physics	6
Elective courses in the College of Agriculture	6
Elective courses in the basic sciences, in social studies, or in courses in the College of Agriculture	3–6

In making his program, the student has the assistance of a faculty adviser, preferably from the field in which he expects to specialize. The adviser is ordinarily assigned to the new student for the first term, but following that he is chosen by the student.

A student must register for at least twelve hours each term, and no new student may register for more than eighteen hours in addition to the regular work in Physical Training and Military Training.

Failures in courses, either required or elective, taken outside the College of Agriculture are counted against the allotment of the twenty free hours that may be taken in any college.

If senior students who have met all requirements desire to take courses outside the College of Agriculture in addition to those required or allowed free, they may do so upon paying for the additional hours

at the rate of tuition prevailing in the colleges where the courses are taken. Those with exceptional scholastic records and with the recommendation of the department in which their major work is done may be permitted to elect, without additional payment, up to ten hours in basic science outside the College of Agriculture beyond the twenty hours normally allowed for election in any college.

Courses in Advanced ROTC may be taken, in addition to the twenty hours of free electives outside the College, without payment for those excess hours.

To be eligible for the degree, the student must maintain an average grade of at least 70 for the entire course.

COURSES IN AGRICULTURE OPEN TO FRESHMEN

Agricultural Economics 2
Agricultural Engineering 1, 21, 31, 40
Agronomy 2
Animal Husbandry 1, 10, 50, 60, 70, 90
Bacteriology 3
Biology 1
Botany 1
Conservation 1, 2, 3, 9
Drawing (mechanical) 1, 5
(freehand) 10, 11
Entomology 10
Floriculture and Ornamental Horticulture 1, 2, 5
Food Science and Technology 1
Meteorology 1
Orientation 1
Pomology 1
Poultry Husbandry 1, 30, 50
Vegetable Crops 3, 22

Combined Courses

PROFESSIONAL AGRICULTURAL ENGINEERING

A JOINT program between the Colleges of Agriculture and Engineering at Cornell University leads to the degree of Bachelor of Agricultural Engineering at the end of five years. Students in this program register in the College of Agriculture during the first four years but take courses in the Colleges of Engineering, Arts and Sciences, and Agriculture. In the fifth year the registration is in the College of Engineering which recommends the candidates to the Trustees of the University for the degree.

Applicants for admission must meet the academic entrance requirements of the College of Engineering. These include English (4 units), elementary and intermediate algebra (2 units), plane geometery (1 unit), and trigonometry (½ unit). A foreign language (2 units) or history (2 units); advanced algebra (½ unit) or solid geometry (½ unit); and chemistry (1 unit) or physics (1 unit) must also be offered. It is strongly recommended that at least 3 of the elective units to make up the balance of 16 be in language or history. Applicants are also advised to offer advanced algebra rather than solid geometry, when a choice is possible.

Each candidate for admission is required to take the Scholastic Aptitude Test of the College Entrance Examination Board and to request the Board to report the results to the Director of Admissions, Cornell University. Candidates are urged to take the tests in January of their senior year.

Since it is the purpose of this curriculum to train engineers for agriculture in its many relationships of buildings, soil and water management, machinery, manufacturing and processing of agricultural products and supplies, drainage, irrigation, and so on, evidence of interest in and background for engineering work in agriculture is a qualification for admission that is given careful consideration. Only a limited number of students are admitted to the program, and agricultural experience and the quality of the academic preparation are important criteria in the selection of applicants.

The curriculum includes basic work in biology, mathematics, physics, and chemistry; a well-rounded selection of courses in engineering science and technology, including agricultural engineering; courses in soils, crops, farm management, and other subjects in agriculture; and general studies to provide a broad and useful training.

Charges for tuition and fees, during the first four years in the curriculum, are the same as outlined on page 33, except that students in

this combined course are required to take more courses outside the College of Agriculture than are permitted to other students and for which they must pay, on a credit-hour basis, as soon as the regular allowance has been used up. The amount of the charge depends upon the specific courses that are taken but is approximately a total of $1000 for residents of the State who are eligible for free tuition. The additional charge for the excess out-of-college instruction in the case of non-residents, who pay the regular tuition of $150 a term, is approximately $600. Payment for the excess hours begins in the fourth term, but the major part is paid in the third and fourth years. In the fifth year these students are subject to the tuition and fees charged in the College of Engineering, which at present are $375 for tuition and $67.50 for fees each term.

A six-week summer session, between the fourth and fifth years, is spent in field study. Regular summer session tuition is charged.

Students in the agricultural engineering curriculum must satisfy the practice requirement of the College of Agriculture by work on farms, as described on pages 24 to 26 of this Announcement.

In applying for admission the applicant should indicate in the application, which should be sent to the Director of Admissions, that he wants to enter the College of Agriculture for the joint program, with the College of Engineering, in agricultural engineering.

WITH BUSINESS AND PUBLIC ADMINISTRATION

Undergraduate students in the College of Agriculture, who are properly qualified, may enroll in their fourth year, in a joint program with the School of Business and Public Administration, leading to the regular Bachelor of Science degree from the College of Agriculture, at the end of that year, and to the Master of Business Administration or the Master of Public Administration, from the School of Business and Public Administration, at the end of the fifth year. A careful selection of courses is necessary if the two degrees are to be earned in five years, so a student who is interested should plan his program with the help of the designated faculty adviser, beginning with the sophomore year. If the decision to enroll is not made until later, consultation with the adviser is necessary to determine whether the requirements for the two degrees can be met in five years or if a longer time is needed.

The opportunity to receive these two degrees in five years, when the normal time is six years, is made possible by the inclusion in the fourth-year schedule of certain courses from the Department of Agricultural Economics that may be acceptable in lieu of certain first-year requirements by the School of Business and Public Administration. Similarly, the Faculty of Agriculture accepts up to nine hours of courses in Business and Public Administration in the fourth year toward the satisfaction of the requirement in the social studies. These substitutions are

allowed only to those who have been accepted for admission by the School of Business and Public Administration and who have their schedules approved by the College of Agriculture faculty adviser for this program.

In the fifth year the student registers only in the School of Business and Public Administration. The program of that year consists of certain core subjects that are taken by all students in Business or Public Administration and of concentrated study in a sector of the field of agricultural management. The specific courses to be taken depends upon the special interest of the student and the particular option that he chooses. Options that have been listed include:

Management of farm cooperatives
Agricultural credit administration
Agricultural industries
Agricultural marketing
Public policy and the administration of government agricultural programs
Management of natural resources

During the first four years these students are subject to the tuition requirements of the College of Agriculture and in the fifth year to those of the School of Business and Public Administration.

For further details about this joint program reference should be made to the *Announcement of the School of Business and Public Administration.*

WITH THE SCHOOL OF NUTRITION

A plan between the College of Agriculture and the School of Nutrition permits students of Agriculture, who qualify, to enroll in a combined curriculum leading to the regular degree from the College of Agriculture, at the end of the fourth year, and the degree of Master of Nutritional Science or Master of Food Science, at the end of the fifth year. To meet the requirements for the two degrees in five years, instead of the normal time of six years, the student in Agriculture should start planning his program with the adviser for students of nutrition not later than the end of the freshman year. During the first four years of this program, students are subject to the tuition requirements of the College of Agriculture and in the fifth year to those of the School of Nutrition.

WITH THE VETERINARY COLLEGE

Students who do their preveterinary work in the College of Agriculture and are accepted by the College of Veterinary Medicine at Cornell University sometimes qualify for degrees from both colleges. This takes about seven years and is ordinarily done by spending the first three years in Agriculture followed by four in Veterinary Medicine, including a combined registration in Agriculture during one or two years.

Payments to the University

TUITION

TUITION is free to undergraduate students pursuing full or special courses in the New York State College of Agriculture, who at the time of their matriculation are, and for at least twelve months prior thereto have been, bona fide residents of the State of New York.

Since physical presence in the State, especially for persons under age, by no means constitutes legal residence, applicants who are at all doubtful of their own right to exemption should address inquiries in advance to the Director of Resident Instruction in the College of Agriculture.

No student is allowed to transfer from any free-tuition course to another course in Cornell University, where tuition is charged, without first paying the difference in tuition for the credit transferred.

Students in Agriculture who are not exempt under these provisions are required to pay tuition of $150 a term. Tuition-paying students transferring from the College of Agriculture to other colleges in the University must first make payment for the difference in tuition for the credit transferred.

Senior students desiring to take, while registered in the College of Agriculture, courses in other colleges in the University, beyond those specifically required and also beyond the twenty hours allowed free, may do so upon payment of tuition for the additional hours at the rate of tuition in the college in which the work is taken.

Tuition and other fees become due when the student registers. The University allows twenty days of grace after the last registration day of each term of the regular session. The last day of grace is printed on the registration card which the student is required to present at the Treasurer's office.

Any student, graduate or undergraduate, except as hereinafter provided, who fails to pay his tuition fees and other indebtedness within the time prescribed by the University is thereby dropped from the University. When in his judgment the circumstances in a particular case so warrant it, the Treasurer may allow an extension of time to complete payments. For such extension, the student is assessed a fee of $2. A reinstatement fee of $5 is assessed in the case of any student who is permitted to continue or return to classes after being dropped from the University for default in payments. For reasons satisfactory to the Treasurer and the Registrar, which must be presented in writing, the above assessment may be waived in any individual case. If the student

withdraws, University fees are charged on the basis of 10 per cent for each week or fraction thereof in attendance.

Any tuition or other fee may be changed by the Board of Trustees to take effect at any time without previous notice.

FEES AND INSTRUCTIONAL EXPENSES

A DEPOSIT OF $45 must be paid after the applicant has received notice of provisional acceptance. At the time of the first registration in the University, the deposit is used to cover matriculation charges, provides for certain graduation expenses, and establishes a fund for undergraduate and alumni class activities.

A DEPOSIT OF $30 is required for a uniform, payable at registration in the first term, in the Basic Course in Military Science and Tactics. Most of this deposit is returned as earned uniform allowance upon completion of the Basic Course.

A UNIVERSITY AND COLLEGE COMPOSITE FEE of $70.00 is required of every student at the beginning of each term. This fee covers the following services: (1) *Health services and medical care.* These services are centered in the University Clinic or out-patient department and in the Cornell Infirmary or hospital. Students are entitled to unlimited visits at the Clinic; laboratory and X-ray examinations indicated for diagnosis and treatment; hospitalization in the Infirmary with medical care for a maximum of fourteen days each term and emergency surgical care. The cost for these services is included in the College and University general fee. For further details, including charges for special services, see the *General Information* booklet. (2) *Willard Straight Hall membership.* Willard Straight Hall is the student union; each student shares in the common privileges afforded by the operation of Willard Straight Hall, subject to regulations approved by the Board of Managers of the Hall. (3) *Laboratory services* for courses taken in the State Colleges. (4) *University administration and endowed college laboratory services.* (5) *Physical recreation.* Each male student is entitled to the use of the gymnasium and the university playgrounds, and to the use of a locker, bathing facilities, and towels in the gymnasium, Barton Hall, or the Schoellkopf Memorial Building; and each woman student to the use of the women's gymnasium, recreation rooms, and playgrounds, and to the use of a locker. (6) *Student activities.* The fee helps to provide funds for worthy student organizations as approved by the Board of Trustees on recommendation of the Student Council.

BOOKS, instruments, and instructional supplies may cost from $25 to $50 a term.

MISCELLANEOUS RULES AND ASSESSMENTS

Every student is held personally responsible for any injury done by him to any of the University's property.

Assessments, charged to the student's account and payable at the Treasurer's office, are levied upon the student in certain circumstances, under the following rules of the University: (1) A matriculated student desiring to register after the close of registration day must first pay a fee of $5. (2) A student desiring to take an examination or other test for the completion of a course in which the grade "absent" or "incomplete" was reported must first pay a fee of $2 for each examination or other test. (3) A student desiring to make an appointment for the required medical examination or conference after twenty days from the last registration day of the term must pay a fee of $2.

For reasons satisfactory to the proper authority, any of the above-mentioned assessments may be waived in any individual case if the student's failure to comply with the regulation was due to ill health or to any other reason beyond his control. Application for such a waiver should be made to the Secretary of the College, or, in the case of the medical examination, to the Director of the Student Health Service.

LIVING ACCOMMODATIONS

FOR MEN...Approximately 2600 spaces are available in the men's Residential Halls. These rooms are in both temporary and permanent dormitories, and accommodate one, two, or three persons. All rooms are completely furnished, including bedding and bed linen. The range of prices in the temporary units is from $182 to $240 a year; in the permanent units, from $248 to $355 a year. Application for rooms will be accepted after January 1 for the following academic year and after October 1 for the semester beginning in February. *A prospective student should not assume that admission to the University automatically reserves a space for him in the dormitories, and it is not necessary to wait until actual admission before applying for a room.* A form for filing application will be furnished, on request, by the Director of Residential Halls, Edmund Ezra Day Hall, Cornell University, Ithaca, New York.

No dining rooms are operated in the men's Residential Halls, but meals are obtainable at any of the cafeterias or dining rooms on the campus, or in the restaurants and cafeterias within the city. From $12 to $16 a week is the minimum allowance recommended for meals, and some students spend more than that.

Off-campus housing may be obtained in private homes and rooming houses. While most of these are on East Hill and adjacent to the campus, some are downtown. Prices of off-campus accommodations range, in general, from $6 to $10 weekly for single rooms, and from $10 to $14 weekly for double rooms. The number of privately owned homes

that offer both room and board is few, and the majority of students living in them utilize the same eating places as outlined for use of men living in Residential Halls.

The University publishes each year a list of off-campus residences that have been inspected and found to have good sanitary arrangements, adequate fire protection, and both satisfactory furniture and living conditions. If a student rents a room not on this list, he should make sure, through personal inspection, that these requirements are satisfactory.

Students planning to live off-campus are advised to come to Ithaca prior to registration to complete room arrangements. Students are usually requested to sign contracts for the full college year, and the details of such agreements should be clearly understood at the outset.

Inquiries on off-campus housing should be addressed to the Off-Campus Housing Office, Department of Residential Halls, Edmund Ezra Day Hall, Cornell University, Ithaca, New York.

FOR WOMEN...All undergraduate women students, with the exception of those who live at home, are required under university policy to live in university residences. These residences consist of dormitories (Residential Halls for Women) and sororities. Exceptional circumstances that seem to make living outside these buildings necessary should be referred to the Dean of Women, Edmund Ezra Day Hall, Cornell University, Ithaca, New York.

The residence charge in the dormitories is $447.50 a term, or $895 a year, and the contract between the student and Residential Halls Office includes board, an allowance of personal laundry, and rent of furnished room with heat and light.

Room applications for residence in University dormitories are not considered unless filed on an official room application blank. Such blanks are enclosed by the Office of Admissions in their letters notifying candidates of acceptance to the University. Requests for information on dormitories should be addressed to the Director of Residential Halls, Edmund Ezra Day Hall, Cornell University, Ithaca, New York.

The Dean of Women has jurisdiction over all women students in the University, and the prospective students are requested to write to her for information concerning matters in which they may need assistance.

Departments of Instruction

WITH OUTLINES OF COURSES THAT MAY BE CHOSEN BY REGULAR OR SPECIAL STUDENTS AS AGRICULTURAL ELECTIVES

Special notice. Unless otherwise noted, all courses are given in the buildings of the College of Agriculture. Courses enclosed in brackets will not be given in 1954–55.

Courses numbered from 1 to 99 are open to undergraduates generally; courses numbered from 100 to 199 are intended primarily for upperclassmen and graduates; courses numbered from 200 up are intended primarily for graduates.

ORIENTATION

1. *ORIENTATION.* Fall term. Credit one hour. Required of all freshmen in Agriculture. One hour a week, to be arranged. Rooms to be announced.

AGRICULTURAL ECONOMICS

FARM MANAGEMENT

102. *FARM MANAGEMENT.* Spring term. Credit five hours. Not open to freshmen. This course should be preceded by as many as possible of the courses dealing with the production of crops and animals. Lectures, M W F 10. Warren 45. Laboratory: for undergraduate students, T W Th or F 2–4; for graduate students, F 4–6. Warren 101. On days when farms are visited the laboratory period is from 2–6. Professor WARREN.

A study of the organization and operation of the farm from the point of view of efficiency and continuous profit; farm records, farm business analysis, factors affecting profits, size of business, choice of enterprises, partnership arrangements, getting started in farming, planning the organization and management of specific farms. One all-day trip and five half-day trips are taken to visit farms in near-by regions.

103. *FARM COST ACCOUNTING.* Fall term. Credit three hours. Prerequisite, course 102. Lectures, W F 8. Warren 160. Laboratory, F 2–4. Warren 60. Brief weekly conferences to be arranged. Associate Professor KEARL.

Cost-accounting methods and procedures as applied to farms. The course considers the organization of accounts; methods of recording information; methods of depreciation determination; methods of cost allocation; summarization and analysis of accounts; making financial and operating statements; and studying farm businesses from the standpoint of management and research.

104. *ADVANCED FARM MANAGEMENT.* Spring term. Credit three hours. Prerequisite, course 102. F 2–4, S 8–10. Warren 160. Professor CUNNINGHAM.

Advanced study of the organization and operation of major types of farms in different regions of New York State, with particular reference to land, market, and other resources. Some trips are taken, leaving Friday morning and returning Saturday night. Approximate transportation expense for trips, to be collected from each student, is $15.

[105. *FARM LABOR.* Fall term. Credit three hours. Prerequisite, course 102. Professor ———.] Not given in 1954–55.

Importance of farm labor, effect of farm organization, farm-labor management, and governmental programs on productivity of farm labor; consideration of wages, hours, accidents and insurance, housing, migrant labor, social security, and other problems.

207. *METHODS OF RESEARCH IN FARM MANAGEMENT.* Fall term. Credit two hours. Open only to graduate students. Th 4–6. Warren 160. Assistant Professor STANTON.

A discussion of research problems in farm management. Opportunity is given to study special problems suggested by members of the group.

PRICES

Attention is directed to courses in mathematics and statistics in the Colleges of Arts and Sciences and Engineering and in the School of Industrial and Labor Relations.

115. *PRICES.* Spring term. Credit three hours. Open to juniors, seniors, and graduate students. Lectures, T Th 9. Laboratory, W 2–4. Warren 45. Professor ———.

A study of the factors affecting the prices of farm products.

BUSINESS MANAGEMENT

Attention is directed to the courses in administrative engineering in the College of Engineering, in economics in the College of Arts and Sciences, and in administration in the School of Hotel Administration.

121. *FINANCIAL STATEMENTS.* Fall term. Credit three hours. Lectures, M W 11. Warren 245. Laboratory, M or T 2–4. Warren 201. Doctor FITZGERALD.

A comprehensive survey of basic accounting principles followed by analysis and interpretation of financial statements.

[122. *ACCOUNTING METHOD.* Spring term. Credit three hours. Two lectures and one laboratory period a week.] Not given in 1954–55.

For persons who wish to understand the records and procedures commonly used in keeping accounts of cooperatives and other businesses; recording business transactions and deriving financial statements; analysis of costs and budgets.

126. *FARMERS' COOPERATIVES.* Fall term. Credit three hours. Lectures, M W 10. Warren 45. Discussions, W or Th 2–4. Warren 145. Professor HEDLUND.

What cooperatives are, what they have tried to do, and what they have done; their special problems of organization, finance, and control.

127. *BUSINESS LAW.* Fall term. Credit three hours. Lectures M W F 9. Warren 231. Limited to upperclassmen. MR. TREMAN.

Consideration is given chiefly to legal problems of particular interest to persons who expect to engage in business, including contracts, liens, mortgages, and negotiable instruments, ownership and leasing of property; wills; estates; inheritance taxation; and other practical problems.

[226. *RESEARCH METHODS AND PROBLEMS IN THE FIELD OF FARMERS' COOPERATIVES.* Fall term. Given in alternate years. Credit two hours. Open to graduate students who have had courses 126 and 240 or their equivalents. Professor HEDLUND.] Not given in 1954–55.

A study of research problems in this field, review of the literature, and consideration of some fundamental problems of cooperatives.

PUBLIC ADMINISTRATION AND FINANCE

Attention is directed to the courses in Government and to Economics 502 (Federal Public Finance) in the College of Arts and Sciences.

130. *THE RURAL CITIZEN AND HIS GOVERNMENT.* Fall term. Credit three hours. T Th 9. Warren 145. Th 2–4. Warren 201. Professor LUTZ.

Government in the United States (local, state, and federal) as it concerns a rural citizen of New York and his part in it. A survey of services or programs performed by government on behalf of its citizens, the ways in which the costs of such services are met, and how government is organized to perform them. Problems which students have the opportunity to examine include: what services should be expanded or curtailed, how their costs should be met, how government efficiency may be improved, and the role of the citizen in arriving at answers to the foregoing problems. Conduct of the course is intended to promote student participation as citizens and, for this reason, includes oral and written reports by students, student discussion and demonstration, and at least two Thursday afternoon field trips.

138. *TAXATION.* Fall term. Credit three hours. Open to juniors, seniors, and graduate students. Lectures, M W F 11. Plant Science 233. Professor KENDRICK.

A study of the principles and practices of public finance, with emphasis on taxation. Among the topics examined are the growth of public expenditures and its causes; historical changes over time in sources of revenue; and property, inheritance, business, and personal income taxation.

236. *PROBLEMS IN PUBLIC ADMINISTRATION.* Fall term. Credit three hours. Primarily for graduate students. T 4–6. Warren 156. Professor LUTZ.

Attention is given to a number of problems in public administration, with special reference to New York, including state and local planning, personnel administration, financial administration, and administrative organization.

237. *ADMINISTRATION OF PUBLIC AGRICULTURAL PROGRAMS.* Spring term. Credit two hours. Primarily for graduate students. F 2–4. Warren 360. Professor LUTZ.

An examination of existing governmental organization for administering and financing public agricultural programs; a study of some problems of administration and finance, including organization of agencies, management of personnel, budgetary management, inter-agency relationships (federal, state, and local), and relationships among federal, state, and local levels of government. Course 130 or one or more courses in government and public administration are desirable but not required before taking this course.

MARKETING

140. *MARKETING.* Spring term. Credit three hours. Lectures, M W F 11, except for weeks when field trips are taken, then M F 11. Warren 45. Field trips begin after spring recess, T W or Th 1:30–5:30. Professor DARRAH.

A study of how farm products are marketed. Special attention is given to the consumption of farm products, the factors that affect consumption, production areas, market channels, the operation of different marketing agencies, marketing services, and costs. One all-day and five half-day trips are taken to visit farms and marketing agencies.

142. *MARKETING FRUITS AND VEGETABLES.* Fall term. Credit four hours. Lectures, M W F 9. Laboratory, W or F 2–4. Warren 245. Professor RASMUSSEN.

A study of the economic factors involved in the marketing of fruits and vegetables; regional and seasonal competition; areas of distribution; methods of handling; costs of marketing; types of marketing organizations; sales methods; transportation and

carrier services; produce law and methods of credit ratings; terminal problems; aspects of retailer- and consumer-demand.

143. *PRICING AND DISTRIBUTION OF MARKET MILK.* Spring term. Credit three hours. Lectures and discussion, M W F 9. Warren 245. Professor SPENCER.

Intended especially for students who plan to operate dairy farms or to work with farmers; also for students majoring in dairy industry and agricultural business.

How milk is utilized; the marketing system for fluid milk; marketing services and marketing agencies; how the price paid by consumers is allocated to producers and to middlemen; principles and practices of pricing milk to dealers and to consumers; ways of distributing returns to producers; pricing objectives, and factors to be considered in determining the proper level of prices; how production and consumption of milk respond to changes in price; classified prices; pooling; seasonal pricing plans; differentials for location, quality, and other factors; the role of cooperatives in milk pricing; federal and state regulation of milk prices.

144. *MARKETING EGGS AND POULTRY.* Fall term. Credit two hours. Open to graduate students and undergraduate students who have had course 140. Lecture and discussion, T Th 11. Warren 245. Professor DARRAH.

A detailed study of the marketing of poultry and eggs. Specific topics to be emphasized include the demand for poultry and eggs, price relationships, markets, salesmanship, interregional competition, and efficiency in marketing.

[146. *DAIRY ORGANIZATION AND MANAGEMENT.* Spring term. Credit two hours. Given in alternate years. Intended especially for students majoring in dairy industry and in agricultural business. Professor SPENCER.] Not given in 1954–55.

Major divisions of the dairy industry; trade associations and their functions; recent developments and trends in trade channels and marketing organization; management problems of milk dealers and cooperatives; ways to increase efficiency and to reduce costs in handling, processing, and distributing milk.

Some of the lectures are given by leaders in different branches of the dairy industry.

147. *MARKETING INSTITUTIONS.* Spring term. Credit two hours. Enrollment limited to 40. F 8. Warren 245. Professor BRUNK.

Economic functions performed by various types of specialized marketing agencies, with an emphasis on their physical operating patterns. Four days of spring vacation are spent in New York City inspecting and studying the marketing of dairy products, eggs, poultry, fruits, vegetables, livestock, and meat. Total cost of the trip need not exceed $50 in addition to transportation to and from New York.

240. *INTRODUCTION TO MARKETING RESEARCH.* Fall term. Credit two hours. Enrollment limited to seniors and graduate students. W 4–6 p.m. Warren 260. Professor BRUNK.

Objectives of marketing research; organization of research agencies; selecting and planning projects; preliminary investigation procedures; surveys; experimental designs; methods engineering; case studies; field and office supervision; preparation of reports; and application of results.

245. *ANALYSIS OF RECENT AND CURRENT RESEARCH IN THE MARKETING OF FRUITS AND VEGETABLES.* Fall term. Credit two hours. Given in alternate years. Open to graduate students majoring in marketing, business management, pomology, vegetable crops, and related fields; and to seniors who have made good records in Marketing 142 and related courses. Students must consult instructor for permission to register. W 4–6. Warren 248. Professor RASMUSSEN.

Studies of recent and current research projects, with emphasis on analysis of research methods used, results obtained, and application of findings.

[246. *SEMINAR ON ECONOMIC PROBLEMS IN MARKETING OF DAIRY PRODUCTS.* Spring term. Credit two hours. Given in alternate years. Consult instructor for permission to register. Professor SPENCER.] Not given in 1954–55.

Selected problems are studied, and plans for solving them through research are developed. Methods and results of previous research on these problems are reviewed.

AGRICULTURAL POLICY

151. *PUBLIC PROBLEMS OF AGRICULTURE.* Fall term. Credit three hours. Open to juniors, seniors, and graduate students. Lectures, T Th 9. Discussions: for undergraduate students, Th 2–4; for graduate students, W 2–4. Warren 160. Assistant Professor ROBINSON.

A review of the economic characteristics of agriculture as an industry and the problems associated with agriculture which are likely to call for collective action. Federal farm programs suggested or enacted during recent decades are analyzed. Among the topics discussed are farm price supports, land tenure, credit arrangements, and soil-conservation programs.

250. *PROBLEMS IN RESOURCE ALLOCATION.* Fall term. Credit three hours. Open to graduate students. Lectures, M W F 12. Warren 160. Assistant Professor ROBINSON.

A review of economic theory applicable to resource allocation problems and various types of models used in deriving input-output relationships, substitution relationships, demand and supply relationships, and the like. Current empirical studies relating to resource allocation problems in agriculture are critically analyzed.

252. *SEMINAR IN PUBLIC PROBLEMS OF AGRICULTURE.* Spring term. Credit two hours. Open to graduate students who have had course 151 or the equivalent. M 2–4. Warren 160. Assistant Professor ROBINSON.

A discussion of current agricultural problems that involve collective or government action, and the proposals of leading economists for dealing with such problems. Special attention is given to techniques of analyzing public-policy issues.

AGRICULTURAL GEOGRAPHY AND LAND ECONOMICS

2. *AGRICULTURAL GEOGRAPHY.* Fall term. Credit four hours. Open to freshmen. Lectures, M W F 9 or 11. Warren 45. Discussion: undergraduate students, W Th or F 2–4 or W or Th 7–9 p.m.; graduate students, F 4–6. Warren 345. Assistant Professor MELLOR.

Historical perspective on present-day agriculture; adjustment of agriculture to natural and to economic environment; crop and livestock production in New York State, the United States, and other countries; interregional trade in agricultural products.

*160. *FOOD ECONOMICS.* Spring term. Credit three hours. Designed especially for students in the School of Nutrition and in the College of Home Economics. Not open to students in the College of Agriculture except by permission of the instructor. Lectures and discussion, M W F 8. Savage 100. Professor DEGRAFF.

Economic aspects of food, including production, distribution, and consumption, with special emphasis on the economics of diet.

181. *AGRICULTURAL LAND ECONOMICS.* Spring term. Credit three hours. Primarily for juniors, seniors, and graduate students. For undergraduates, courses 2 and 102 should precede or accompany this course. Lectures, T Th 8. Warren 145. Discussion and laboratory, primarily for undergraduate students, Th 2–4; primarily for graduate students, T 2–4. Warren 160. When field trips are taken, the laboratory period is from 1 to 5:30. Associate Professor CONKLIN.

*This course counts as a non-agricultural elective for students in the College of Agriculture.

Physical land variability; systems of physical land classification; fundamental economic concepts; traditional and revised theories of land use and farming returns; systems of economic land classification; patterns of change in land use; the effect of institutional arrangements upon land use; problems of conservation; and factors involved in land-policy formation. Two field trips are taken.

280. *SEMINAR IN AGRICULTURAL GEOGRAPHY.* Spring term. Credit two hours. Open only to graduate students. Registration by permission. W 7:30 p.m. Warren 350. Professor DEGRAFF.

Consideration of basic problems of comparative agriculture and of population and the food supply. Specific topics vary from year to year.

281. *SPECIAL PROBLEMS IN AGRICULTURAL LAND ECONOMICS.* Fall or spring term. Credit one or more hours. Open only to graduate students. Prerequisite, course 181 and permission of the instructor. Associate Professor CONKLIN.

Special work on any subject in the field of land economics that is of particular interest to the student. The student normally is expected to prepare a report on his work that is suitable for mimeograph reproduction and distribution.

282. *INTRODUCTION TO METHODS OF RESEARCH IN AGRICULTURAL LAND ECONOMICS.* Spring term. Credit three hours. Open only to graduate students. Courses 181 and 207 and at least three hours of statistics should precede or accompany this course. S 9–12. One or more field trips, S 9–6. Associate Professor CONKLIN.

A critical discussion of research in agricultural land economics.

FARM FINANCE AND FARM APPRAISAL

184. *FARM FINANCE.* Spring term. Credit three hours. Open to graduate students and to those undergraduate students who have passed course 102 with a grade of 80 or better. Lectures, T Th 10. Discussion, T 2–4. Warren 145. Professor HEDLUND.

A study of sound financial arrangements for farmers and the credit institutions which serve them.

187. *FARM APPRAISAL.* Fall term. Credit three hours. Open to graduate students and to undergraduate students who have passed course 102 with a grade of 80 or better. Lecture, T 10. Laboratory, T 1–5. Warren 101. Professor WARREN.

A study of factors governing the price of farms, methods of farm valuation, and practice in the appraisal of farms of various types.

DEPARTMENTAL SEMINAR AND RESEARCH

195. *UNDERGRADUATE RESEARCH.* Fall and spring terms. Credit one to three hours depending upon the problem undertaken and the extent and quality of work done. A student desiring to register in this course must obtain the written permission of a professor who will supervise the work. Open to seniors with grade averages of 80 or higher.

The course is designed to afford opportunity for outstanding undergraduates to carry out independent studies of suitable problems under appropriate supervision.

299. *SEMINAR.* Fall and spring term. M 4. Warren 401. Required of graduate students taking either a major or minor in the Department. Departmental staff.

AGRICULTURAL ENGINEERING

1. *FARM MECHANICS.* Fall or spring term. Credit three hours. Lectures: T Th 10, fall term, Stocking 218: spring term, Rice 300. Laboratory, M T W Th or F 2–4:30. Agricultural Engineering Laboratories. Professor JENNINGS and assistants.

A course planned to give training in understanding the farm application of mechanical methods and appliances and to develop ability to think and to reason

in terms of these. It covers such farm equipment as pumps, water systems, plumbing, hoists and elevators, farm wiring and motors, refrigeration, and air fans.

2. *INTRODUCTION TO AGRICULTURAL ENGINEERING.* Spring term. Credit two hours. Lectures, M W 8. Stocking 120. Limited to students in the five-year Agricultural Engineering Curriculum. Associate Professor GRAY and Assistant Professor MILLIER.

A course based upon engineering applications to agriculture. Historical developments are reviewed to stimulate considerations for future agricultural progress.

Basic engineering principles are emphasized in the discussion of agricultural practices and problems that are of primary interest to the agricultural engineer. Problems are used to provide practice in the application of principles and to test the students comprehension of subject matter.

10. *HOUSEHOLD MECHANICS.* Fall or spring term. Credit three hours. For women students. Not open to freshmen. Lectures, T Th 12. Caldwell 100. Laboratory, W Th or F 2–4:30. Agricultural Engineering Laboratories. Professor WRIGHT.

A course intended to develop ability to think and reason in terms of mechanical devices. For this training, exercises are given on automobiles, sewing machines, electrical applicances, water supply and plumbing, faucet repairs, and on some of the simpler machines of the home.

21. *FARM SURVEYING.* Spring term. Credit three hours. Prerequisite, Trigonometry. Lectures, M W 10. Stocking 119. Recitation, F 10. Laboratory, M T or W 2–4:30. Agricultural Engineering Research Laboratory, Tower Road. Assistant Professor LEVINE.

A study of the use and care of the simpler surveying equipment. Special emphasis is placed on their application to farm problems. This course cannot be substituted for the surveying requirement of the five-year Agricultural Engineering program.

31. *FARM STRUCTURES.* Fall term. Credit three hours. Prerequisites, Intermediate Algebra and Physics. Lectures, M W F 8. Stocking 218. Assistant Professor LEVINE and Associate Professor GRAY.

A course in the elementary problems of farm buildings; a study of basic structural requirements, insulation, ventilation, and functional requirements for farm animals.

32. *FARM STRUCTURES LABORATORY.* Fall term. Credit one hour. Open only to agricultural engineering students who are currently taking or have previously taken course 31 and Drawing 1. Laboratory, W 2–4:30. Agricultural Engineering Research Laboratory. Tower Road. Assistant Professor LEVINE.

A course designed to teach some of the practical applications of basic design principles to farm-building construction. It includes practical work in the mixing and testing of concrete, visits to some of the farm buildings on the campus to see different types of construction, and some work on the general design and layout of farm buildings for efficiency of operation.

40. *GENERAL FARM SHOP.* Fall or spring term. Credit two hours a term. Open to all students. Lecture, T 9. Stocking 120. Laboratory, M T or Th 1–5. Limited to thirty students per section. Agricultural Engineering Laboratories. Professor Foss.

A course designed to acquaint the student with the common woodworking, tool fitting, cold and sheet metal working, forging, welding, ropework, and wood-finishing jobs commonly found on the farm. The correct use of hand tools on new construction and repair work is emphasized.

41. *TEACHING FARM MECHANICS.* Spring term. Credit three hours. Prerequisite, course 40. Lectures, M W 9. Laboratory, W 2–4:30. Agricultural Engineering Laboratories. Professor Foss.

A course designed to prepare the prospective teacher to lay out, equip, and

manage the general shop and to teach farm mechanics in the high school. A field trip is taken to visit school shops.

42. *WELDING.* Fall or spring term. Credit one hour. One laboratory period, M T or Th 8–10:30, or M or T 2–4:30; in spring term, given also F 2–4:30. Limited to twenty students a section. Mr. CLOUGH.

A course giving fundamentals and practice of oxyacetylene welding and cutting of metals; spot welding and arc welding, with special emphasis on farm-shop construction and repair. One all-day field trip is taken on Monday or Tuesday.

43. *ADVANCED GENERAL FARM SHOP.* Fall or spring term. Credit one or two hours a term. Prerequisite, courses 40 and 42 and permission of instructor. One or two laboratories, F 2–4:30, and one to be arranged. Professor Foss and Mr. CLOUGH.

Construction and repair jobs are used to teach the operation, care, and adjustments of the circular saw, band saw, jointer, planer, wood and metal lathe, grinder, hacksaw, sheet metal machines, and welding equipment.

101. *ELECTRICITY ON THE FARM.* Fall term. Credit three hours. Open to juniors and seniors. Prerequisite, course 1 and Physics 103 and 104 or the equivalent. Lectures, M W 11. Stocking 119. Laboratory, M 2–4:30. Agricultural Engineering Research Laboratory, Tower Road. Associate Professor SHEPARDSON.

The course deals with the application of electricity for light, heat, and power on farms, with emphasis on the principles of operation, selection, and installation of electrical equipment for the farmstead. One half-day field trip is taken.

102. *FARM POWER.* Fall term. Credit three hours. Open to juniors and seniors. Prerequisite, course 1 or Physics 103 and 104, or the equivalent. Lectures, T Th 11. Rice 300. One recitation period a week, to be arranged. Laboratory, M T W or Th 2–4:30. Agricultural Engineering Laboratories. Associate Professor SHEPARDSON and Assistant Professor MILLIER.

A study of the principles of operation and adjustment of internal combustion engines and their farm applications. Principal emphasis on farm tractors, including care and operation, power transmission, power requirements, and economic factors.

103. *FIELD MACHINERY.* Spring term. Credit three hours. Open to juniors and seniors. Prerequisite, course 1 or Physics 103 and 104, or the equivalent. Lectures, T Th 11. Stocking 218. One recitation period a week, to be arranged. Laboratory, M T W or Th 2–4:30. Agricultural Engineering Laboratories. Associate Professor SHEPARDSON and Assistant Professor MILLIER.

A study of the use, care, operation, and adjustment of farm field machines. Machines in each of the major groups, tillage, seeding, harvesting, processing, spraying and dusting, fertilizing, and crop loading are included.

121. *FARM PRACTICE IN SOIL AND WATER CONSERVATION.* Spring term. Credit three hours. Prerequisite, Agronomy 1 or the equivalent. Agricultural Engineering 21 and Agronomy 11 are recommended. Lectures, M F 8. Caldwell 100. Laboratory, F 2–5. Agricultural Engineering Research Laboratory, Tower Road. Associate Professor ZWERMAN and Assistant Professor LEVINE.

A beginning course in principles and methods used in soil conservation. Emphasis is placed on New York State conditions. Engineering and agronomic aspects of soil conservation receive primary consideration. Students who have credit for Agronomy 102 or Agricultural Engineering 221 should consult the instructor before registering. One all-day field trip is taken on Saturday.

203. *AGRICULTURAL MACHINERY DESIGN.* Fall term. Credit three hours. Open only to seniors and graduate students. Prerequisite, Drawing and Mechanics

1151, 1152, and 1153, or their equivalents. Lectures, T Th 8. Computing period, W 2–4:30. Stocking 410. Professor TERRY.

Methods of stress analysis and machine design applied to typical agricultural machines. Analytical and empirical treatment of velocities and accelerations, static and dynamic forces. Suitability of materials, power requirements, lubrication, safety, and economic factors.

204. *EXPERIMENTAL AGRICULTURAL ENGINEERING.* Spring term. Credit three hours. Registration by permission of the instructor. Lecture, T 8. Stocking 120. Laboratory, Th 8–11. Agricultural Engineering Laboratories. Professor TERRY.

Laboratory and field tests of power plants and tractors. Determination of power output, tractive effort, and stability characteristics. Power requirements of farm implements and machines under varying conditions of operation. Comprehensive reports are required.

221. *SOIL AND WATER MANAGEMENT.* Spring term. Credit three hours. Open only to seniors and graduate students. Prerequisite, course 21, Agronomy 1, and Fluid Mechanics 2331, or the equivalent. Lectures, T Th 9. Laboratory, Th 2–4:30. Agricultural Engineering Research Laboratory, Tower Road, and field. Associate Professor GRAY.

An advanced course in the design and construction of tile drainage systems, sprinkler systems for supplemental irrigation, diversion ditches, and farm ponds.

231. *FARM STRUCTURES DESIGN.* Spring term. Credit three hours. Open only to seniors and graduate students. Prerequisite, Mechanics 1153 or the equivalent. Lectures, T Th 10. Stocking 120. Laboratory, T 2–4:30. Associate Professor GRAY.

Structural design principles for farm buildings. Characteristics of materials, principles of sanitation, ventilation, heating, and refrigeration are included.

251. *SPECIAL PROBLEMS IN AGRICULTURAL ENGINEERING.* Fall or spring term. Credit one or more hours. Prerequisite, adequate ability and training for the work proposed, and permission to register. Professor FRENCH and staff.

Special work in any branch of agricultural engineering on problems under investigation by the department or of special interest to the student, provided, in the latter case, that adequate facilities can be obained.

252. *SEMINAR.* Fall and spring terms. Required of graduate students. M 4:30.

Presentation and discussion of research and special problems in agricultural engineering. Professor FRENCH.

253. *SPECIAL TOPICS IN AGRICULTURAL ENGINEERING.* Fall and spring terms. Credit one hour. Open only to seniors. T 12. Stocking 119. Professor FRENCH.

Presentation and discussion of the opportunities, qualifications, and responsibilities for positions of service in the various fields of Agricultural Engineering.

AGRONOMY

SOIL SCIENCE

1. *THE NATURE AND PROPERTIES OF SOILS.* Fall or spring term. Credit five hours. Prerequisite, Chemistry 102 or 106 and Geology 115. Lectures, M W F 9. Caldwell 100. Laboratory, M T W Th or F 2–4:30. Caldwell 49. Two recitations, to be arranged. Graduate students auditing this course are expected to take the examinations. At the first laboratory period each student shall furnish a pint sample of soil for use in the laboratory. Professor BRADY.

A comprehensive course dealing with the composition, properties, and plant relations of soils, with particular reference to the fundamental principles of maintaining soil fertility.

6. *SOILS.* Spring term. Credit three hours. Prerequisite, Biochemistry 2 or its equivalent. Primarily for freshmen in the two-year course. Four-year students admitted only with permission of instructor. Lectures, T Th 9. Caldwell 100. Laboratory, M T W Th or F 2–4:30. Caldwell 201. Mr. HILTBOLD.

A course dealing with the composition, properties, and plant relations of soils, with particular reference to the practical use of lime, fertilizers, and other means of maintaining soil fertility and of controlling soil erosion.

101. *SOIL CLASSIFICATION AND SURVEY.* Spring term. Credit three hours. Prerequisite, course 1 or 6 or the equivalent. Lectures, T Th 10. Caldwell 100. Laboratory, M or T 2–4:30. Caldwell 143. Field work replaces the laboratory as soon as weather permits; time to be arranged. Professor CLINE.

Soil formation, classification, and geography. Field work consists of practice in soil surveying.

FARM PRACTICE IN SOIL AND WATER CONSERVATION (Agricultural Engineering 121). Spring term. Credit three hours. Prerequisite, Agronomy 1 or the equivalent. Agricultural Engineering 21 and Agronomy 11 are recommended. Lectures, M F 8. Caldwell 100. Laboratory, F 2–5. Agricultural Engineering Research Laboratory. Associate Professor ZWERMAN and Assistant Professor LEVINE.

A beginning course in principles and methods used in soil conservation. Emphasis is placed on New York State conditions. Engineering and agronomic aspects of soil conservation receive primary consideration. Students who have credit for Agronomy 102 or Agricultural Engineering 221 should consult the Instructor before registering. One all-day field trip is taken on Saturday.

[103. *ORGANIC SOILS.* Fall term. Credit two hours. Given in alternate years. Prerequisite, course 1. Associate Professor DAWSON.] Not given in 1954–55.

Physical and chemical properties of organic soils used for crop production and soil conditioning. One all-day Saturday field trip.

[104. *FOREST SOILS.* Fall term. Credit two hours. Given in alternate years. Prerequisite, course 1 and Botany 31. Time and place to be arranged. Occasional field trips. Assistant Professor STONE.] Not given in 1954–55.

Ecology of forest soils and principles of forest-soil management, including biology and relation to soil development and hydrology. An informal three- or four-day field trip through the Adirondack region is made prior to registration for the fall term; attendance is urged although not required. Consult instructor for details.

105. *SOIL AND CROP MANAGEMENT.* Fall term. Credit three hours. Primarily for advanced undergraduates and graduate minors in Agronomy. Prerequisite, courses 1 or 6 and 2 or 11, or permission of the instructor. Lectures, T Th 9. Warren 201. Laboratory, W or Th 2–4:30. Caldwell 143. Professor ———.

The application of the principles of soil science and crop production to complete soil-management systems under common farm conditions in New York. Emphasis is on the use and evaluation of rotations, manure, fertilizers, lime, and supporting practices for crop production in systems that maintain soil productivity. Laboratories consist of (1) field trips to study operating farms, and (2) problems in planning systems of management under specified farm conditions. A few field trips to near-by farms.

106. *SOIL MICROBIOLOGY.* Fall term. Credit three hours. Prerequisite, Agronomy 1 or Bacteriology 1 and Chemistry 303 or the equivalent. The lectures without the laboratory may be taken for two hours' credit with the permission of the instructor. Lectures, M W 8. Caldwell 100. Laboratory F 2–4:30. Caldwell 201. Professor BROADBENT.

A study of the major groups of soil microorganisms, the soil organic fraction, and the biochemical functions of the soil population.

[107. *PHYSICAL EDAPHOLOGY.* Fall term. Credit three hours. Primarily for advanced undergraduates and graduate minors in Agronomy. Prerequisite, course 1 or permission of the instructor. Associate Professor R. D. MILLER.] Not given in 1954–55.

The principles of soil physics, with reference to soil management and crop production.

201. *SOIL CHEMISTRY, LECTURES.* Spring term. Credit three hours. Prerequisite, course 1 and Qualitative Analysis. A course in physical chemistry is recommended. M W F 9. Caldwell 143. Professor PEECH.

Chemical composition and properties of soils. Discussion of chemical processes in the soil, including the behavior of different plant-nutrient elements.

202. *CHEMICAL METHODS OF SOIL ANALYSIS.* Spring term. Credit three hours. Prerequisite, course 1 and Qualitative and Quantitative Analysis. Enrollment limited to twenty students. T Th 2–4:30. Caldwell 294. Professor PEECH.

Lectures, laboratory exercises, and demonstrations designed to familiarize the student with different chemical techniques for studying soils.

203. *THE GENESIS, MORPHOLOGY, AND CLASSIFICATION OF SOILS.* Spring term. Credit three hours. Credit two hours for students who have had Agronomy 101. Given in alternate years. Lectures, M W F 8. Caldwell 143. Professor CLINE.

The course deals with (1) the principles of classification as applied to soils, (2) the factors of soil formation and their effects on the soil, and (3) the characteristics, development, and use of the Great Soil Groups of the world. One all-day Saturday field trip is taken on a date to be arranged.

204. *ISOTOPIC TECHNIQUES IN AGRICULTURE AND BIOLOGY.* Fall term. Credit two hours. Prerequisite, permission of instructor. Lecture, demonstrations, and laboratory work. Enrollment limited to ten students. Assistant Professor BRANDT.

Application of isotopic techniques to agriculture and biology.

205. *SOIL FERTILITY, ADVANCED COURSE.* Fall term. Credit three hours. Prerequisite, course 1 and Chemistry 201 or its equivalent. Lectures, T Th S 8. Caldwell 143. Professor BRADFIELD.

A study of the soil as a source of the mineral nutrients needed for effective crop production and of the properties and use of liming materials, fertilizers, and manures.

207. *SOIL PHYSICS, LECTURES.* Fall term. Credit three hours. Given in alternate years. Primarily for graduate students. Prerequisite, course 107 or permission of the instructor. Lectures, M W F 8. Caldwell 143. Associate Professor R. D. MILLER.

A study of physical properties and processes of soils, with emphasis on the fundamental physical principles involved.

208. *PHYSICAL PROPERTIES OF SOILS, LABORATORY.* Fall term. Credit three hours. Must be preceded or accompanied by course 207. Enrollment limited. M W 2–4:30. Caldwell 294. Associate Professor R. D. MILLER.

Laboratory exercises and demonstrations designed to familiarize the student with different physical and physiochemical techniques used in soil investigations.

209. *RESEARCH IN SOIL SCIENCE.* Fall and spring terms. All members of the professorial staff.

210. *SELECTED TOPICS IN SOIL SCIENCE.* Fall and spring terms. Credit one to three hours. Prerequisite, ten credit hours in Soil Science. Time to be arranged. Fall term:

(a) *SOIL PHYSICS.* Credit one hour. Associate Professor R. D. MILLER.

(c) *TOPIC TO BE ARRANGED.* Credit from one to three hours. Staff.

Spring term:

(d) *SELECTED TOPIC IN SOIL AND WATER CONSERVATION.* Credit one hour. Associate Professor ZWERMAN.

(a) *SOIL PHYSICS.* Credit one hour. Associate Professor R. D. MILLER.

(b) *SOIL CHEMISTRY.* Credit one hour. Professor PEECH.

(c) *TOPIC TO BE ARRANGED.* Credit from one to three hours. Staff.

FIELD CROPS

2. *INTRODUCTION TO FIELD CROPS.* Spring term. Credit three hours. Open to freshmen. Upperclassmen and others who have the prerequisites should take course 11 rather than 2. Discussion period. W F 10. Caldwell 100. Laboratory, M T W Th or F 2–4:30. Auditors not permitted. Not open to graduate students. Caldwell 250. Professor HARTWIG.

A study of the culture of the common field crops that are produced in the Northeastern States, with emphasis on the practical aspects. Rotations with their seed and fertilizer requirements are worked out for three or four type-farms where the objective is to produce feed and food.

11. *PRODUCTION OF FIELD CROPS.* Fall term. Credit four hours. Prerequisite, a course in soils. Graduate students must consult the instructor before registering. Auditors not permitted. Lectures, M W F 10. Caldwell 100. Laboratory, M T W Th or F 2–4:30. Caldwell 250. Professor HARTWIG.

A course dealing principally with the crops that are used for feeding livestock and poultry. Emphasis is placed on the hay, silage, pasture, and grain crops of the United States. Cultural methods, crop rotations, fertilizer practices, soil and climatic adaptation, and the better varieties of the important crops are considered.

211. *SPECIAL TOPIC IN FIELD CROPS.* Fall and spring terms. Credit one or two hours. Meeting once weekly for graduate students and undergraduate majors. Professors HARTWIG, KENNEDY, MACDONALD, and MUSGRAVE.

112. *PASTURE AND HAY CROPS.* Spring term. Credit three hours. For juniors, seniors, and graduate students. Prerequisite, courses 1 and 11 or their equivalent, or courses 2 and 6 by permission. Lectures and discussions. T Th S 8. Caldwell 100. Three required field trips in April and May, M T W Th or F 1:30–5. Professor KENNEDY.

The establishment, maintenance, productivity, use, and quality of various pasture and hay crops are discussed, especially those for humid, temperate climates. Practical applications are emphasized. Of particular value to those interested in agronomy, animal production, and soil conservation.

213. *CROP ECOLOGY.* Fall term. Credit three hours. Given in alternate years. Prerequisite, course 11 and Botany 31 or their equivalent. Lectures, T Th S 10. Warren 260. Professor MUSGRAVE.

An analysis of the environment of crop plants and their ecological responses, with emphasis on the cereals and on the legumes and grasses for forage.

[214. *GRASSLANDS AND GRASSLAND RESEARCH.* Fall term. Credit three hours. Given in alternate years. Prerequisite, course 112, Plant Breeding 102 or 203, and Botany 31, or their equivalent, and permission to register. Professor MACDONALD.] Not given in 1954–55.

A study of factors underlying the development and maintenance of grassland types and the principles and practices of grassland and forage-crop investigations.

219. *RESEARCH IN FIELD-CROP PRODUCTION.* Fall, spring, and summer terms. Professors HARTWIG, KENNEDY, MACDONALD, and MUSGRAVE.

DEPARTMENTAL SEMINAR

290. *SEMINAR.* Fall and spring terms. Required of graduate students taking work in the department, S 11–12:30. Caldwell 100.

ANIMAL HUSBANDRY

Students are advised to register for courses 1, 10, and 20 before taking the more advanced courses.

LIVESTOCK PRODUCTION

1. *INTRODUCTORY LIVESTOCK PRODUCTION.* Fall term. Credit three hours. Lectures, M W 8 or 10. Wing A. Laboratory, T Th or F 2–4:30, W 11–1. Judging Pavilion. Assistant Professor SHEFFY and assistants.

A survey course that gives the student a concept of the scope of the animal industry, an insight into the opportunities it offers, and perception of its fundamental problems. It includes the fundamentals of successful livestock production that form a foundation on which to build specialized knowledge and skill in succeeding courses. It should serve equally well for students majoring in other fields, who will take but one course in Animal Husbandry. Animals specifically covered are beef cattle, sheep, swine, and horses. Two scheduled evening prelims are given.

10. *LIVESTOCK FEEDING.* Fall or spring term. Credit four hours. Prerequisite, Chemistry 101, 105, or Biochemistry 2. Lectures: fall term, M W F 11; spring term, M W F 9. Wing A. Laboratory: fall term, Th or F 2–4:20, Wing A; spring term, M W Th or F, 2–4:20. Wing C. Professor S. E. SMITH, Assistant Professor WARNER, and assistants.

The feeding of farm animals, including the general basic principles, feeding standards, the computation of rations, and the composition and nutritive value of livestock feeds.

HEALTH AND DISEASES OF ANIMALS (VETERINARY 61). Spring term. Credit three hours. Not open to freshmen or to those who have had no courses in animal husbandry. Lectures, M W F 11. Veterinary College. Professor GILMAN.

The course is designed to give the student a clear conception of the causes and nature of the diseases of animals, with suggestions for their prevention. Special attention is given to the methods of preventing the spread of the infectious and epizootic diseases. Such information as is practicable is given for the treatment of slight injuries and for first aid in emergencies.

41. *LIVESTOCK JUDGING: BEEF CATTLE, HORSES, SHEEP, AND SWINE.* Fall term. Credit two hours. Prerequisite, course 1. Lecture and laboratory period, W 2–5:10. Judging Pavilion. Professor J. I. MILLER.

A beginning course in judging market and breeding classes of beef cattle, horses, sheep, and swine, with major emphasis on a detailed study of the type of livestock which best meets present-day demands.

42. *LIVESTOCK JUDGING: BEEF CATTLE, HORSES, SHEEP, AND SWINE.* Spring term. Credit two hours. Prerequisite, course 41 or permission to register. M Th 2–4:20. Judging Pavilion and Livestock Barns. Students may register for only one laboratory period for one hour of credit by permission of instructor. Professor J. I. MILLER.

A course in judging market and breeding classes of beef cattle, horses, sheep, and swine, with major emphasis on a study of the type of breeding stock which best meets modern demands. One field trip of about two days' duration is made to give additional opportunities to study livestock in outstanding herds or flocks.

43. *ADVANCED LIVESTOCK JUDGING.* Fall term. Credit two hours. Registration by permission. M F 2–4:20. Judging Pavilion and Livestock Barns. Professor J. I. MILLER.

An advanced type study of purebred market and breeding classes of beef cattle, horses, sheep, and swine. Intended primarily to give additional training to successful students of course 42. Two 2-day trips are taken on week ends. Members of this group are selected to represent the institution in intercollegiate judging competitions.

60. *BEEF CATTLE.* Spring term. Credit three hours. Prerequisite, course 1 or permission to register. Lectures, W F 10. Wing A. Laboratory, F 2–4:20. Judging Pavilion and Beef Cattle barn. Professor J. I. MILLER.

A general course in beef-cattle production. The management, feeding, breeding, selection, and marketing problems involved in the beef-cattle enterprise are emphasized. A one-day field trip is taken to study successful beef production methods.

70. *SWINE.* Spring term. Credit three hours. Prerequisite, course 1 or permission to register. Lectures, W F 11. Wing A. Practice, T 2–4:20. Judging Pavilion and Swine Barn. Professor J. P. WILLMAN.

A general course in the care, feeding, breeding, and management of swine. Lectures, recitations, and discussions; studies in swine selection; field trips and practical exercises in the handling and care of swine. A one-day field trip is taken.

80. *SHEEP.* Fall term. Credit three hours. Prerequisite, course 1 or permission to register. Lectures, T Th 10. Wing A. Practice, M 2–4:20. Judging Pavilion and Sheep Barn. Professor J. P. WILLMAN.

A general course in the care, breeding, feeding, and management of the farm flock; feeding and fattening of lambs; practice in judging and handling of sheep and wool. Lectures, recitations, demonstrations, discussions, reports, and field trips intended to give students a practical knowledge of sheep production. A one-day field trip is taken.

115. *ADVANCED LIVESTOCK FEEDING AND APPLIED ANIMAL NUTRITION.* Spring term. Credit two hours. For advanced and graduate students. Prerequisite, a course in livestock feeding and a course in animal nutrition. Lectures and discussions, T Th 9. Wing E. Professor MORRISON.

This course includes a presentation and discussion of recent developments in the feeding and nutrition of farm animals, study of experimental methods, and critical analysis of published data.

MEATS

90. *MEAT AND MEAT PRODUCTS.* Fall or spring term. Credit three hours. Course 1 is recommended before registering for this course. Lecture, M 8. Wing C. Laboratory, M T or W 1–5. Registration limited to sixteen students in each section. Assistant Professor NAUMANN.

A course in livestock slaughtering, retail meat cutting, live animal-carcass relationships, and the storage and preservation of meat and meat products.

92. *MEAT AND MEAT PRODUCTS.* Fall or spring term. Credit two hours. For women students. Not open to freshmen. Designed primarily for students in the College of Home Economics. Registration limited to sixteen students in each laboratory section. Lecture, Th 11. Wing B. Laboratory, Th or F 2–4:20. Meat Laboratory. Associate Professor WELLINGTON and the Poultry Department staff.

A course dealing with the major phases of meats, poultry, and eggs; wholesale and retail buying, nutritive value of meats, cutting, freezing, curing, canning, cooking, and miscellaneous topics.

93. *MEAT CUTTING.* Fall or spring term. Credit one hour. Prerequisite, course 90 or 92, and permission to register. Enrollment limited to five students each term.

One laboratory period each week, time to be arranged with the instructor. Mr. HOLLEY.

This course offers supervised practice in meat selection, cutting, and grading for students intending to specialize in meats work.

94. *MEAT JUDGING.* Fall term. Credit one hour. Prerequisite, course 90. Registration limited to sixteen students. Lecture and laboratory period, W 11–1. Meat Laboratory. Associate Professor WELLINGTON.

A course in market classes and grades of meat, judging, selection, and identification of carcasses and cuts. Field trips and some evening classes are included to provide additional experience.

DAIRY HUSBANDRY

50. *DAIRY CATTLE.* Fall or spring term. Credit four hours. Courses 10 and 20 are recommended before registering for this course. Lectures: fall term, T Th S 8; spring term, T Th S 10. Wing A. Laboratory: fall term, M 2–4:20 or S 9–11:20; spring term, M or Th 2–4:20. Wing A and Judging Pavilion. Professor TURK, Associate Professor SCHULTZ, and assistants.

This course deals with some of the economic aspects of the dairy industry; study of dairy breeds; factors in breeding and development of dairy cattle; milking methods and milk production problems; efficient feeding; and care, management, and health of the dairy herd. Practice in selection, herd management, formulating of rations, planning of breeding programs, and keeping of records.

51. *DAIRY-CATTLE JUDGING.* Spring term. Credit two hours. Prerequisite, course 50. Practice, W 2–4:20 and S 10–12. (In the last half of the semester, the Wednesday meetings are discontinued and the class meets all day Saturday.) Judging Pavilion. Professor TRIMBERGER.

A beginning course in the selection and judging of all breeds of dairy cattle. Practice includes all-day trips on Saturday during the latter part of the term to herds in the State.

52. *ADVANCED DAIRY-CATTLE JUDGING.* Fall term. Credit one hour. Prerequisite, course 51. Registration by permission. Practice hours to be arranged. Professor TRIMBERGER.

This course is intended primarily to give additional training in comparative judging to successful students of Course 51. Members of the class are selected to represent the institution in intercollegiate judging competitions.

150. *ADVANCED DAIRY PRODUCTION.* Spring term. Credit three hours. Prerequisite, course 50. Open only to juniors and seniors. Lectures, T Th 11. Lecture and discussion, T 2–4:20. Wing A. Professor TRIMBERGER.

Analysis of breeding and management programs in successful herds. Evaluation of the programs of dairy-cattle breed associations. Emphasis is placed on the application of the principles of dairy breeding, feeding, and management to the development and operation of a successful dairy farm.

ANIMAL BREEDING AND PHYSIOLOGY OF REPRODUCTION

20. *ANIMAL BREEDING.* Fall term. Credit three hours. Prerequisite, Botany 1, Biology 1, or Zoology 103 and 104. Lectures, M W 9. Wing A. Recitation, demonstration, and laboratory, M T W Th or F 2–4:20. Wing C. Associate Professor R. W. BRATTON, Assistant Professor FOOTE, and assistants.

An introduction to the anatomy and physiology of reproduction and the improvement of farm animals through the application of genetics.

120. *PROBLEMS IN ANIMAL BREEDING.* Fall term. Credit three hours. Pre-

requisite, course 20 or Plant Breeding 101. Lectures, T Th 11. Wing C. Laboratory, W or F 2–4:20. Wing E. Professor HENDERSON.

A consideration of the problems involved in the improvement of the larger farm animals and the application of genetics in their solution.

125. *PHYSIOLOGY OF REPRODUCTION.* Spring Term. Credit three hours. Open to graduate students and upperclassmen. Prerequisite, Course 127 or the equivalent. Lectures, M W 10. Wing C.

Laboratory, T 2–4:30. Wing C. Professor ASDELL, Associate Professor HANSEL, and assistants.

An advanced course in reproduction, principally in mammals. The laboratory work consists of a series of small projects designed to illustrate modern large animal breeding techniques and the effects of the major hormones of reproduction and lactation.

126. *APPLIED ANIMAL PHYSIOLOGY.* Fall term. Credit one hour. Open to upperclassmen and graduate students. T 9. Wing C. Professor ASDELL.

The application of physiological methods to growth, reproduction, and lactation in farm animals.

127. *ELEMENTARY ENDOCRINOLOGY.* Fall term. Credit two hours. T Th 10. Wing C. Associate Professor HANSEL.

A general course in the physiology of the endocrine system. Lectures and demonstrations showing the effects of the hormones of the endocrine glands and the roles played by each in the regulation of normal body processes.

ANIMAL NUTRITION

110. *PRINCIPLES OF ANIMAL NUTRITION.* Fall term. Credit three hours. For seniors and graduate students. Prerequisite, a course in human or veterinary physiology and a course in organic chemistry or biochemistry. Lectures, M W F 10. Savage 100. Professor LOOSLI.

The chemistry and physiology of nutrition and the nutritive requirements for growth, reproduction, lactation, and other body functions.

111. *LABORATORY WORK IN ANIMAL NUTRITION.* Fall term. Credit three hours. Prerequisite, Quantitative Analysis. M W F 2–4:20. Stocking 160. Professor MCCAY.

Each student engages in a series of small research projects with living animals, such as rats, dogs, and other animals, where both classical techniques, such as chemical balance studies, and very modern ones are taught. The use of animals and the application of biochemical methods in advancing the science of nutrition are included.

210. *SPECIAL TOPICS IN ANIMAL NUTRITION.* Spring term. Credit one hour. Registration by permission. Th 8. Wing E. Professors LOOSLI, MCCAY, and S. E. SMITH.

A presentation and discussion of the knowledge and techniques of special fields of animal nutrition, with particular reference to farm animals.

215. *HISTORY OF NUTRITION.* Fall term. Credit one hour. Th 4:15. Savage 130. Professor MCCAY.

The purpose of the course is to familiarize the student with the background literature in nutrition and to improve his technique in using the libraries. Each student prepares four written reports and summarizes these in brief oral reports to learn better ways to present technical information.

219. *SEMINAR IN ANIMAL NUTRITION.* Fall term. Credit one hour. Open to graduate students with major field of study in animal nutrition. Registration by permission. T 4:30. Rice 201. Animal Nutrition staff.

A critical review of the literature and other topics of special interest to graduate students in animal nutrition.

DEPARTMENTAL RESEARCH AND SEMINAR

200. *RESEARCH.* Fall and spring terms. Credit and hours by arrangement. For graduate and advanced students only. All members of Professional staff. Professor TURK in charge.

201. *SEMINAR.* Fall and spring terms. Required of all graduate students taking either a major or a minor subject in Animal Husbandry. Advanced undergraduates are admitted by permission, and, if a satisfactory report on an approved subject is presented, may receive not to exceed two hours credit. M 11. Professor TURK and departmental staff.

BACTERIOLOGY

Students are accepted as majors in bacteriology only upon consent of the head of the Department or of a member of the staff designated to act for him. Acceptance is granted only to those students who follow the prescribed courses outlined by the Department and whose scholastic records are entirely satisfactory.

1. *GENERAL BACTERIOLOGY.* Fall term. Credit six hours. Prerequisite, Chemistry 102 or 106. Lectures, M W F 11. Stocking 218. Laboratory practice, M W F 2–4:30. Stocking 301. Associate Professor SEELEY and assistants.

An introductory course; general survey of the field of bacteriology, with the fundamentals essential to further work in the subject.

2. *GENERAL BACTERIOLOGY.* Fall term. Credit three hours. Prerequisite, Chemistry 102 or 106. Not open to undergraduate students in the College of Agriculture. Lectures, M W F 11. Stocking 218. Associate Professor SEELEY.

The same as the lecture part of course 1. By special permission, this course may be elected by graduate students and advanced students in certain professional courses, such as Chemical Engineering.

3. *AGRICULTURAL BACTERIOLOGY.* Spring term. Credit three hours. Not recommended for first-year students. Not accepted as prerequisite for advanced courses. Lectures, M W F 11. Stocking 218. Professor NAYLOR.

The basic principles of bacteriology and their applications in agriculture, industry, personal hygiene, and public health.

4. *HOUSEHOLD BACTERIOLOGY.* Spring term. Credit three hours. Prerequisite, Elementary Chemistry. Limited to students in Home Economics. Lectures, T Th 10. Stocking 218. Laboratory, T Th 8–9:50 or T Th 11–12:50. Stocking 301. Assistant Professor VANDEMARK and assistants.

An elementary, practical course for students in Home Economics.

103. *ADVANCED BACTERIOLOGY.* Spring term. Credit six hours. Prerequisite, course 1, quantitative analysis, and organic chemistry. Lectures and laboratory practice, M W F 2–5:30. Stocking 119. Associate Professor SEELEY and assistants.

A systematic study of the important groups of bacteria that are of significance in water, milk, foods, and industry, together with the methods used in these fields of bacteriology.

105. *HIGHER BACTERIA AND RELATED MICROORGANISMS.* Fall term. Credit four hours. Prerequisite, course 1. Lectures, recitations, and laboratory practice. T Th 1:40–5. Stocking 119 and 323. Professor KNAYSI and assistant.

A study of the higher bacteria, together with the yeast and molds that are of especial importance to the bacteriologist.

SOIL MICROBIOLOGY (AGRONOMY 106.) Fall term. Credit three hours. Prerequisite, course 1 and Chemistry 201 or its equivalent. Lectures, M W 8. Caldwell 100. Laboratory, F 2–4:30. Caldwell 201. Professor BROADBENT.

A course in biological soil processes designed primarily for students specializing in soil technology or bacteriology. The laboratory work is supplemented by reports and by abstracts of important papers on the subject.

PATHOGENIC BACTERIOLOGY. (See the *Announcement of the New York State Veterinary College.)*

210. *PHYSIOLOGY OF BACTERIA.* Fall term. Credit two hours. Prerequisite, course 1 and at least one additional course in bacteriology and one in organic chemistry. Lectures, T Th 10. Stocking 120. Associate Professor DELWICHE.

The physiology of bacteria and the biochemistry of microbic processes.

212. *SELECTED TOPICS IN BACTERIOLOGY.* Fall and spring terms. Credit one hour a term. For seniors and graduate students. F 10. Stocking 120. Staff.

213. *MORPHOLOGY AND CYTOLOGY OF BACTERIA.* Fall term. Credit three hours. For seniors and graduate students. Lectures, T Th S 9. Stocking 119. Professor KNAYSI.

The morphology, cytology, and microchemistry of microorganisms.

215. *CHEMISTRY OF BACTERIAL PROCESSES.* Spring term. Credit two hours. For seniors and graduate students. Lectures, M W 11. Stocking 119. Associate Professor DELWICHE.

The chemistry of metabolism, fermentation, and nutrition of microorganisms.

216. *GENETICS OF MICROORGANISMS.* Spring term. Credit two hours. For seniors and graduate students. Lectures, M W 12. Stocking 119. Professor ZELLE.

An advanced course for students who have had thorough basic training in bacteriology and genetics.

220. *RESEARCH.* Fall or spring term. Credit one or more hours, by arrangement. For advanced students. Assistant Professor VANDEMARK.

Special problems in any phase of bacteriology may be elected.

221. *SEMINAR.* Fall and spring terms. Without credit. Hours to be arranged. Stocking. Staff.

BIOCHEMISTRY AND NUTRITION

2. *INTRODUCTORY AGRICULTURAL CHEMISTRY.* Fall term. Credit five hours. Open only to two-year students in the College of Agriculture. Lectures and recitations: M W F 9. Plant Science 233; T Th 9. Caldwell 100. Associate Professor NEAL and assistants.

Lectures, demonstrations, and recitations dealing with the fundamental principles of chemistry and their application to agricultural practices. This course is not accepted as a prerequisite for further courses in Chemistry or Biochemistry.

[5. *AGRICULTURAL BIOCHEMISTRY.* Spring term. Credit three hours. Prerequisite, Chemistry 102 or 106 or the equivalent. May not be taken for credit by students who have completed a more advanced course in this Department. Associate Professor NEAL.] Not given in 1954–55.

An elementary course for the general agricultural students, dealing with the biochemistry of crop and animal production, of the materials concerned, such as feeds, fertilizers, and insecticides, and of the products that result.

10. *ELEMENTS OF BIOCHEMISTRY, LECTURES.* Fall term. Credit four hours. Prerequisite, Chemistry 303 and 305 or Food and Nutrition 215. Lectures, M T Th S 8. Savage 145. Associate Professor DANIEL.

Primarily for students in the College of Home Economics. An elementary course dealing with the chemistry of biological substances and their transformations (digestion and metabolism) in the animal organism.

11. *ELEMENTS OF BIOCHEMISTRY, LABORATORY.* Fall term. Credit two hours. Prerequisite or parallel, course 10. Laboratories, T Th 2–4:20 or W 2–4:20 and S 9–11:20. Savage 210. Associate Professor DANIEL and assistants.

Laboratory practice with biochemical substances and experiments designed to illustrate chemical reactions which may occur in the animal body.

101. *GENERAL BIOCHEMISTRY, LECTURE.* Fall term. Credit four hours. Prerequisites, Chemistry 215 or the equivalent; and 303 and 305 or the equivalent. Lectures, M W F S 11. Savage 100. Professor WILLIAMS.

For graduate and advanced undergraduate students, dealing with the chemistry of plant and animal substances and the reactions occurring in biological systems.

102. *GENERAL BIOCHEMISTRY, LABORATORY.* Fall term. Credit two hours. Prerequisite or parallel, course 101. Laboratory, M W or T Th 2–4:20. Savage 230. Professor WILLIAMS and assistants.

Laboratory practice with plant and animal materials and the experimental study of their properties.

130. *PRINCIPLES OF FOOD PRESERVATION.* Spring term. Credit two hours. Prerequisite, Biochemistry or Organic Chemistry. Lectures, T Th 10. Savage 145. Associate Professor CLARK.

A discussion of the basic physical, chemical, and biological principles of food preservation and their application in refining, dehydration, cold storage, freezing, canning, fermentation, chemical preservation, and packaging. The effects of food processing upon the maintenance of nutritive value and on other food qualities.

140. *SELECTED TOPICS IN FOOD BIOCHEMISTRY.* Spring term. Credit two hours. Given in alternate years. Prerequisite, course 101. Lectures, M W 10. Savage 145. Associate Professor CLARK.

A discussion of some of the important nonmicrobial changes in foods, such as denaturation and the Maillard browning reaction. Emphasis is placed on the occurrence, significance, and prevention or control of the changes as they affect the color, odor, flavor, texture, or nutritive value of foods.

150. *BIOCHEMISTRY AND NUTRITION OF THE VITAMINS.* Spring term. Credit two hours. Given in alternate years. Prerequisite, Chemistry 303 and 305 or the equivalent, Biochemistry 101 or the equivalent, or Biochemistry 5 or 10 by permission. Lectures, T Th 10. Savage 100. Associate Professor DANIEL.

Primarily for graduate students, dealing with the chemical, physiological, and nutritional aspects of the vitamins.

201. *BIOCHEMISTRY OF LIPIDS AND CARBOHYDRATES.* Spring term. Credit two hours. Prerequisites, courses 101 and 102 and Physical Chemistry 405 and 406, or the equivalent. Lectures M W 9. Savage 100. Professor SUMNER and Associate Professor W. L. NELSON.

Discussion of the properties and biological role of the lipids and carbohydrates.

202. *BIOCHEMISTRY OF PROTEINS AND ENZYMES.* Spring term. Credit two hours. Prerequisite, courses 101 and 102 and Physical Chemistry 405 and 406, or the equivalent. Lectures, T Th 9. Savage 100. Professor SUMNER.

Discussion of the properties and biological role of proteins and enzymes.

203. *ADVANCED BIOCHEMISTRY.* Laboratory. Spring term. Credit three hours. Prerequisite, to accompany or follow courses 201 and 202. Limited enrollment.

Registration by permission of the instructor only. M W 2–5. Savage 230. Professor SUMNER and Associate Professor W. L. NELSON.

Laboratory experiments dealing with enzymes, co-factors, and substrates of importance in metabolic processes. Practice is given in the use of special techniques employed in isolation, characterization, and mode of action of enzymes and enzyme systems. Emphasis is placed on interpretation of data and written reports covering the various experiments.

[210. *PLANT BIOCHEMISTRY.* Spring term. Credit two hours. Given in alternate years. Prerequisite, courses 101 and 102 or the equivalent. Associate Professor NEAL.] Not given in 1954–55.

Lectures and discussion of biochemical topics of particular interest to students in plant sciences.

220. *SPECIAL TOPICS IN NUTRITION.* Spring term. Credit one hour. Primarily for graduate students. Prerequisite, a course in biochemistry and a course in nutrition. Registration by permission. T 8. Savage 145. Professors MAYNARD and WILLIAMS.

290. *BIOCHEMISTRY SEMINAR.* Fall term. Credit one hour. Required of majors and minors. Prerequisite, courses 201 and 202, or the equivalent. Registration by permission. M 4:15. Savage 100. Professor SUMNER and staff.

Assignments and discussions of recent advances in biochemistry.

292. *NUTRITION SEMINAR.* Spring term. Credit one hour. Registration by permission. M 4:15. Savage 100. Professor MAYNARD and staff.

Assignments and discussions of recent advances in the biochemistry and physiology of nutrition.

294. *FOOD BIOCHEMISTRY SEMINAR.* Fall term. Credit one hour. Registration by permission. T 4:30. Savage 130. Associate Professor CLARK.

Assignments and discussions of literature pertaining to the biochemical aspects of foods and food processing.

BOTANY

Students in botany may be accepted as specializing students at the end of their sophomore year only upon approval of the Department of Botany. They are required to take certain prescribed courses and must maintain a high scholastic average. Students wishing instruction in special groups of plants or in special subjects should consult the Department.

1. *GENERAL BOTANY.* Fall and spring terms. Credit three hours a term. If taken after Biology 1, credit two hours a term. This course may be begun in the spring term. Lectures, T Th 9 or 11. Plant Science 233. One laboratory a week, M T W Th or F 2–4:30, T 10–12:30, F or S 8–10:30, or S 9–11:30. Plant Science 240, 242, and 262. Professor PETRY, instructors, and assistants.

A survey of the fundamental facts and principles of plant life. The work of the first term deals with the structures and functions of the higher plants, with special emphasis on their nutrition. The work of the second term traces the evolution of the plant kingdom, as illustrated by representatives of the principal groups, and concludes with a brief introduction to the principles of classification of the flowering plants.

3. *POISONOUS PLANTS.* Spring term. Credit one hour. Registration is limited to students in the Veterinary College. Lectures, S 9. Laboratory, Th 2–4:30. Plant Science 202. Professor MUENSCHER.

Emphasis is given to the recognition of the principal kinds of stock-poisoning plants.

55. *WEEDS AND POISONOUS PLANTS.* Fall term. Credit three hours. Prerequisite, course 1 or its equivalent. Lecture, F 9. Laboratory, W F 2–4:30. Plant Science 202. Professor MUENSCHER.

Special emphasis is given to the habits, characteristics, and properties which make weeds and poisonous plants harmful or undesirable, the losses and injury produced by them and the methods for their prevention, eradication, and control.

56. *SEED ANALYSIS.* Spring term. Credit one hour. Prerequisite, course 1 or its equivalent. Lectures and laboratory, F 2–4:30. Plant Science 202. Professor MUENSCHER.

A course designed for students in the applied plant-science departments and those interested in preparing to be seed analysts. Practice is given in making purity analyses and germination tests according to standard and official methods and recommendations. Students wishing to become seed technologists may arrange to take advanced work under course 171.

115. *AQUATIC PLANTS.* Spring term. Credit three hours. Prerequisite, course 1 or its equivalent. Lecture, M 9. Laboratory, M W 2–4:30. Plant Science 203. Professor MUENSCHER.

A study of the taxonomy and ecology of fresh-water plants, beginning with the algae and concluding with the acquatic angiosperms.

117. *TAXONOMY OF VASCULAR PLANTS.* Fall term. Credit four hours. Prerequisite, course 1 or its equivalent and permission to register. Lectures, T Th 9. Plant Science 143. Laboratory, T Th 2–4:30. Mann 464. Professor CLAUSEN.

A survey of the kinds of seed plants and ferns, their classification, gross morphology, geographical distribution, and economic importance, together with an introduction to the principles and literature of taxonomy. Methods of identification are stressed.

118. *TAXONOMY AND ECOLOGY OF VASCULAR PLANTS.* Spring term. Credit four hours. Prerequisite, course 117 and either course 124 or Plant Breeding 101 and permission to register. Lectures, T Th 9. Plant Science 143. Laboratory, T Th 2–4:30. Mann 464. Professor CLAUSEN.

A continuation of course 117, including a consideration of evolutionary patterns in the seed plants and ferns; a demonstration of the principles and methods of taxonomy; and an introduction to problems of classification in the flora of North America. Trips are scheduled in laboratory periods and on several Sundays in the second half of the term.

217. *SEMINAR IN TAXONOMY OF VASCULAR PLANTS.* Fall and spring terms. Prerequisite, course 118. Required of graduate students taking work in taxonomy. Conference, M 4:30. Mann 464. Professor CLAUSEN.

A consideration of current research and literature; reports on problems of research by graduate students and members of the staff.

123. *PLANT ANATOMY.* Fall term. Credit four hours. Prerequisite, course 1 or its equivalent and permission to register. Lectures, T Th 9. Plant Science 37. Laboratory, either M W 2–4:30 or T Th 10–12:30. Plant Science 211. Professor BANKS.

A detailed study of the internal structure of vascular plants with emphasis on determination and interpretation.

124. *CYTOLOGY.* Fall term. Credit four hours. Prerequisite, course 1 or Zoology 102 or 104 or the equivalent. Lectures, M W 9. Plant Science 143. Laboratory, M W or T Th 10–12:30. Assignments to laboratory section must be made at time of registration. Plant Science 219. Associate Professor UHL.

The principal topics considered are protoplasm, cells and their components,

nuclear and cell division, meiosis and fertilization, and the relation of these to the problems of development, reproduction, taxonomy, and heredity. Both plant and animal materials are used. Microtechnique is not included.

125. *MICROTECHNIQUE.* Spring term. Credit two hours. Prerequisite, course 1 and permission to register. Hours to be arranged. Associate Professor UHL.

A laboratory course in methods of preparing plant material for microscopical study.

224. *CYTOGENETICS.* Spring term. Credit three hours. Prerequisite, course 124 and Plant Breeding 101 or the equivalent. Lectures, M W 9. Plant Science 143. Laboratory, M or W 10–12:30. Plant Science 219. Professor RANDOLPH.

An advanced course dealing mainly with the chromosome mechanism of heredity and with recent researches in cytology, cytotaxonomy, and cytogenetics.

[126. *MORPHOLOGY OF VASCULAR PLANTS.* Spring term. Credit three hours a term. Prerequisite, course 1 or its equivalent, and permission to register. Given in alternate years. Professor BANKS.] Not given in 1954–55.

An advanced course in the comparative morphology, life histories, and phylogeny of the lower vascular plants, both fossil and recent.

127. *MORPHOLOGY OF VASCULAR PLANTS.* Spring term. Credit three hours. Prerequisite, course 1 or its equivalent, and permission to register. Lectures, M W 11. Plant Science 141. Laboratory, M W 2–4:30. Plant Science 211. Professor BANKS.

An advanced course in the comparative morphology, life histories, and phylogeny of the higher vascular plants, both fossil and recent.

COMPARATIVE MORPHOLOGY OF FUNGI. Given in the Department of Plant Pathology.

31. *PLANT PHYSIOLOGY.* Fall or spring term. Credit four hours. Prerequisite, course 1 or Biology 1 and introductory chemistry. Lectures, T Th 10. Plant Science 143. Laboratory, T Th, or W F 2–4:30, or M 2–4:30, and S 8–10:30. Plant Science 227. Professor D. G. CLARK.

This course is designed to acquaint the student with the general principles of plant physiology. Topics such as water relations, photosynthesis, translocation, digestion, respiration, mineral nutrition, growth, and reproduction are studied in detail. Particular emphasis is placed, both in laboratory and classroom, on the discussion of principles and their application to plants.

231. *PLANT PHYSIOLOGY, ADVANCED LECTURE COURSE.* Fall and spring terms. Credit three hours a term. Limited to seniors and graduate students. Prerequisite, training in botany and chemistry, to be determined in each case by the professor in charge. Lectures, M W F 10. Plant Science 143. Professor STEWARD.

232. *PLANT PHYSIOLOGY, ADVANCED LABORATORY COURSE.* Fall and spring terms. Credit three hours a term. Prerequisite or parallel, course 231. Laboratory, T Th or W F 2–5:30. Plant Science 241. Assistant Professor W. D. BONNER.

233. *SEMINAR IN PLANT PHYSIOLOGY.* Fall and spring terms. Required of graduate students taking work in the department. Conference, F 11. Plant Science Seminar Room. Professors D. G. CLARK and STEWARD and Assistant Professor W. D. BONNER.

The discussion of current problems in plant physiology; the presentation of reports on the research of graduate students and members of the staff.

234. *PLANT PHYSIOLOGY, ADVANCED LECTURE COURSE.* Fall term. Credit one hour. Prerequisite, course 231 or adequate preparation in botany and chemistry. W 8. Plant Science 37. Professor SNYDER.

This course deals primarily with physiology in relation to hormones, photoperiodism, and vernalization.

171. *SPECIAL PROBLEMS IN GENERAL BOTANY, TAXONOMY, MORPHOLOGY, ANATOMY, PALEOBOTANY, ECONOMIC BOTANY, CYTOLOGY, AND PHYSIOLOGY.* Fall and spring terms. Credit not less than two hours a term. By appointment. Professors BANKS, D. G. CLARK, CLAUSEN, MUENSCHER, PETRY, RANDOLPH, and STEWARD, Associate Professor UHL and Assistant Professor W. D. BONNER.

Students engaged in special problems or making special studies may register in this course. They must satisfy the instructor under whom the work is taken that their preparation warrants their choice of problem.

CONSERVATION

Students desiring to specialize in conservation may obtain a suggested list of courses for the four-year period by consulting the Department.

1. *CONSERVATION OF WILDLIFE.* Fall term. Credit two hours. Lectures, T Th 11 and occasional evenings. Fernow 122. Professors SWANSON, CLAUSEN, W. J. HAMILTON, JR., KELLOGG, PALM, and RANEY, Associate Professors, AYERS, CONKLIN, HEWITT, and WEBSTER, Assistant Professor L. S. HAMILTON, and cooperating specialists.

An introduction to the wildlife resources of North America and their inter-relations with other resources; the importance of the flora and fauna in our economic and cultural life; the history of wildlife decimation, the present need for conservation, and the methods employed to reestablish the various species. Serves as an introductory course for conservation majors and is of general cultural and informational interest to students in other fields.

2. *FARM FORESTRY.* Fall term. Credit three hours. Lectures, M W 11. Laboratory, T or W 2–4:30. Fernow 122. Assistant Professor L. S. HAMILTON.

Principal trees of New York State woodlands; identification, silvical requirements, and uses; volume measurements of logs, trees, and stands; growth and yields; reforestation; development of natural and planted stands; utilization and marketing of timber; properties and uses of wood; wood preservation; sustained-yield management of woodlands.

3. *CONSERVATION OF NATURAL RESOURCES.* Spring term. Credit two hours. Lectures, T Th 10. Fernow 122. Assistant Professor L. S. HAMILTON.

The natural-resource problems of the United States; natural resources in national welfare; the conservation movement; public land policies; natural resources of major importance; use and exploitation; present inventories; problems of the future; essential points in a national conservation program.

4. *MANAGEMENT OF WOODLANDS.* Spring term. Credit three hours. Lectures, M W 11. Fernow 210. Laboratory, M 2–4:30. Assistant Professor L. S. HAMILTON.

Limited to those majoring in wildlife management and allied fields. Forest and type mapping; stock inventories by sampling methods; cover types and ecological relationships; silvicultural methods of improving and regenerating forests; protection from fire and other injurious agencies; forest-management plans; federal and state laws dealing with major aspects of forest policy.

8. *ELEMENTARY TAXONOMY AND NATURAL HISTORY OF VERTEBRATES.* Fall and spring terms. Credit three hours a term. Prerequisite, Zoology 103 and 104 or 101 and 102. Lecture M 8. Fernow 122. Laboratory, M W 2–4:30 or T Th 2–4:30. Fernow 14. Professors W. J. HAMILTON, JR. and RANEY.

Lectures on fishes, amphibia, reptiles, birds, and mammals, dealing with the

principles of classification and nomenclature, characteristics, relationships, and bionomics of these groups. The laboratory gives practice in the identification of North American species. Field studies of the local fauna are undertaken during the fall and spring.

9. *GENERAL ORNITHOLOGY.* Spring term. Credit three hours. Lectures M W 11. Fernow 122. Field and Laboratory, W or Th 2–4:30. Fernow 210. Associate Professor SIBLEY.

Introduction to the biology of birds; their structure, classification, adaptations for flight, migration, distribution, behavior, ecology, and evolution. Field and laboratory work on identification of local species. Field studies will include two all-day field trips.

22. *ICHTHYOLOGY.* Spring term. Credit three hours. Prerequisite, course 8 or permission to register. Lectures, T Th 8. Fernow 122. Laboratory, F 2–4:30. Fernow 14. Professor RANEY.

Evolution, relationships, structure, habits, ecology, and literature of fishes. Laboratory studies on structure and identification of North American fishes. Field studies on ecology and life histories include one all-day field trip.

[23. *HERPETOLOGY.* Spring term. Credit two hours. Prerequisite, course 8. Professors W. J. HAMILTON, JR. and RANEY.] Not given in 1954–55.

Structure and classification of amphibia and reptiles; their characteristics, relationships, and bionomics.

25. *MAMMALOGY.* Fall term. Credit three hours. Prerequisite, course 8 or permission of instructor. Lectures, T Th 8. Fernow 122. Laboratory, F 2–4:30 or S 8–10:30. Fernow 14. Professor W. J. HAMILTON, JR.

Principal phases of mammalian life; origin, distribution, habits, and literature. Laboratory periods are devoted to methods of field collecting, census taking, life-history studies, preparation of skins and skeletons, and identification of North American species.

101. *SELECTED TOPICS IN CONSERVATION.* Fall term. Credit one hour. One meeting each week, to be arranged. Fernow 102. Professor SWANSON.

Primarily for graduate students who are also registered in course 1, but open to other graduate students. Discussions of important conservation problems of current interest.

102. *PRINCIPLES OF WILDLIFE MANAGEMENT.* Fall term. Credit three hours. Prerequisite, consent of instructor. Lectures, M W F 10, and two field trips to be arranged. Fernow 122. Associate Professor HEWETT.

Fundamental mechanisms of wildlife populations; ecological, social, and economic aspects of wildlife management.

103. *WILDLIFE MANAGEMENT METHODS.* Spring term. Credit three hours. Prerequisite, consent of instructor. Lecture, F 11. Laboratory, S 8–1. Fernow 212. Several all-day field trips. Associate Professor HEWITT.

Methods and techniques in the management of game species and their practical application in the field. Intended for students interested in professional wildlife management.

110. *ECONOMIC ZOOLOGY.* Spring term. Credit one hour. Prerequisite, course 8. F 8. Fernow 122. Associate Professor EADIE.

Food habits of mammals of economic importance; control of injurious species; economics of wildlife resources; conservation legislation.

112. *LITERATURE OF ECONOMIC ZOOLOGY, CONSERVATION, AND ECOLOGY.* Spring term. Credit one hour. Limited to upperclass students and

graduates. W 9. Fernow 14. Professors W. J. HAMILTON, JR. and RANEY and Associate Professor EADIE.

The literature of economic zoology, ecology, and kindred fields; fish and fisheries, aquaria, amphibians, reptiles, and mammals; wildlife management; preserves; game farms, animals in relation to recreation.

122. *ADVANCED ICHTHYOLOGY.* Fall term. Credit one or two hours. Prerequisite, courses 8 and 22, Elementary Statistics, and permission of instructor. Limited to seniors and graduate students. Hours to be arranged. Fernow 14. Professor RANEY.

Lectures (one hour) on speciation, intergradation, hybridization, distribution in fishes, and biometrical methods in vertebrate taxonomy. Methods of carrying on ecological and life-history investigations. Laboratory (one period) on taxonomic studies of eastern North American fishes.

126. *ADVANCED ORNITHOLOGY.* Fall term. Credit three hours. Prerequisite, course 8 or 9 and permission of instructor. Lecture and laboratory, T Th 2–5. Fernow 210. Associate Professor SIBLEY.

Structure and classification of birds; geographical distribution and characteristics of orders and families. Advanced study of avian biology, systematics, and the literature.

131. *TECHNIQUES IN ORNITHOLOGY.* Fall term. Credit three hours. Prerequisite, courses 8 and 9, Botany 1, and Entomology 12, or permission of instructor. Lecture and Laboratory, M W 2–5. Fernow 210. Professor KELLOGG.

For students planning to teach or engage in ornithology either as a profession or as an avocation. Emphasized are: photography of birds with modern equipment, recording of bird songs and techniques of sound study with audio spectrograph and other tools, and preparation of technical papers, news releases, and radio programs in relation to conservation, together with studies of classroom, extension, and field instruction and of survey methods in ornithology.

133. *CURRENT RESEARCH AND RESEARCH METHODS IN ORNITHOLOGY.* Fall term. Credit two hours. Prerequisite, permission to register. Limited to graduate students. Lecture and laboratory, hours to be arranged. Fernow 210. Associate Professor SIBLEY.

Studies and reports on current and classic research literature, especially that dealing with avian speciation; practice in research methods and preparation of papers; application of statistics, serology, and other techniques to systematics.

LIMNOLOGY (ENTOMOLOGY AND LIMNOLOGY 171.) Fall term. Credit three hours. See full description under *Entomology and Limnology.*

173. *FISHERY BIOLOGY.* Fall term. Credit three hours. Prerequisite, permission of instructor. Lectures, M W F 12. Fernow 122. Associate Professor WEBSTER.

The life histories and ecological requirements of some fresh-water game fishes; and the principles and techniques of fishery management.

174. *FISH CULTURE.* Spring term. Credit two hours. Prerequisite, permission of instructor. Lecture M 12. Laboratory, M 2–4:30. Fernow 126. Associate Professor A. M. PHILLIPS, JR.

A study of the production of fish in hatcheries and hatchery management.

175. *FISHERY BIOLOGY LABORATORY.* Spring term. Credit two hours. Prerequisite, course 173 and permission of instructor. Limited to graduate majors and minors, and to qualified seniors. T Th 1:30–5. Fernow 126. Associate Professor WEBSTER.

Field and biometrical exercises in fishery management.

WATER POLLUTION CONTROL (CIVIL ENGINEERING 2531). Fall term. Credit three hours. See full description in *Announcement of the College of Engineering.*

180. *OCEANOGRAPHY.* Fall term. Credit three hours. Prerequisite, general zoology, botany, chemistry, and physics, or the equivalents. Lectures, T Th 10. Laboratory, Th 12. Fernow 122. Associate Professor AYERS.

Physical and chemical aspects of the oceans, particularly as background for marine ecology; geography and geology of the ocean floor; currents, tides; distribution of temperatures. Laboratory work in processing oceanographic data.

181. *MARINE ECOLOGY.* Spring term. Credit three hours. Prerequisite, general zoology, chemistry, physics, and either invertebrate zoology or limnology. Lectures, M W F 9. Fernow 122. Associate Professor AYERS.

The sea as an environment; the physical and chemical characteristics of marine habitats; the productivity of the sea; the relation of hydrography to fisheries and faunal distributions.

400–407. *RESEARCH PROBLEMS.* Either term. Credit and hours to be arranged. Problems are undertaken in any of the fields of study in the Department, but adequate preparation in the specialized field, and permission of the instructor are prerequisites. Fernow Hall.

400. *FISHERY BIOLOGY.* Associate Professors WEBSTER and A. M. PHILLIPS, JR.

401. *HERPETOLOGY.* Professors W. J. HAMILTON, JR. and RANEY.

402. *ICHTHYOLOGY.* Professor RANEY.

403. *MAMMALOGY.* Professor W. J. HAMILTON, JR. and Associate Professor EADIE.

404. *ORNITHOLOGY.* Professor KELLOGG and Associate Professor SIBLEY.

405. *WILDLIFE MANAGEMENT.* Professor SWANSON and Associate Professors EADIE and HEWITT.

406. *FORESTRY.* Assistant Professors L. S. HAMILTON and MORROW.

407. *OCEANOGRAPHY.* Associate Professor AYERS.

410. *CONSERVATION SEMINAR.* Fall and spring terms. Without credit. Required of graduate students majoring in conservation, but open to all who are interested. 7:30–9:00 p.m. Staff.

Discussions of literature and current research in the broad field of conservation of birds, mammals, and fishes.

DAIRY INDUSTRY

Students intending to specialize in Dairy Industry are urged to elect qualitative and quantitative analysis, organic chemistry, and general bacteriology so that these courses may be completed by the end of the first term of the junior year.

1. *INTRODUCTORY DAIRY SCIENCE.* Fall term. Credit three hours. Prerequisite, Chemistry 102 or 106. Lectures, T Th 11. Stocking 218. Laboratory, T Th 1:40–4:30, or S 8–11. Stocking 209. Professor J. C. WHITE and assistants.

The scientific and practical aspects of milk and a survey of the dairy industry. Especial attention is given to the composition of milk and its physical and chemical properties, quantitative tests for fat and other constituents.

5. *BIOCHEMICAL CONTROL OF DAIRY PRODUCTS.* Spring term. Credit two hours. Prerequisite, course 1. Lecture, F 11. Laboratory practice, F 1–4. Stocking 120. Associate Professor KRUKOVSKY.

The chemical analysis of milk and dairy products, and the biochemical changes in these products that cause undesirable flavors and other changes.

22. *MARKET MILK.* Spring term. Credit three hours. Prerequisite, course 1 and Bacteriology 1 or 3. Not open to dairy majors. Lectures, M W 10. Recitation, W 2. Stocking 119. Professor HOLLAND.

The scientific, technical, and sanitary aspects of the fluid milk industry.

102. *MARKET MILK.* Spring term. Credit five hours. Prerequisite, course 1, and Bacteriology 1 or its equivalent. Lectures, M W 10. Laboratory, M W 2–6. Stocking 120. Professor HOLLAND and assistants.

The scientific, technical, and sanitary aspects of the fluid-milk industry.

103. *MILK-PRODUCTS MANUFACTURING.* Fall term. Credit five hours. Prerequisite, course 1, Bacteriology 1, and organic chemistry. T Th 11–4:30. Stocking 120. Associate Professor KOSIKOWSKI and assistant.

The principles and practice of making butter, cheese, and casein, including a study of the physical, chemical, and biological factors involved. Consideration is given also to commercial operations and dairy-plant management.

104. *MILK-PRODUCTS MANUFACTURING.* Spring term. Credit five hours. Prerequisite, course 102. T Th 11–4:30. Stocking 119. Assistant Professor JORDAN and assistant.

The principles and practice of making condensed and evaporated milk, milk powders, ice cream, and by-products, including a study of the physical, chemical, and biological factors involved.

108. *COMMERCIAL GRADES OF DAIRY PRODUCTS.* Spring term. Credit one hour. Should be preceded by course 1. W 2–5. Associate Professor SHIPE.

The classification of dairy products and the factors involved in grading them.

111. *ANALYTICAL METHODS.* Spring term. Credit four hours. Prerequisite, quantitative analysis. Lectures, T Th 11. Laboratory practice, T 1–5. Stocking 120. Professor HERRINGTON and assistant.

A study of the more important operations and apparatus used in quantitative analysis, and their practical application.

113. *CHEMISTRY OF MILK.* Fall term. Credit two hours. Prerequisite, qualitative and quantitative analysis and organic chemistry. Lectures, M W 8. Stocking 120. Professor HERRINGTON and Associate Professor SHIPE.

The subject matter changes from year to year. It may deal with colloidal phenomena in milk and its products. It may deal with the enzymes of milk, with milk proteins, with milk fat, or with chemical reactions and equilibria in dairy products. Graduate students may re-register in successive years and find little duplication of material.

130. *DAIRY ENGINEERING.* Fall term. Credit five hours. Prerequisite, Physics 103 and 104 or the equivalent and course I. Lectures, M W F 10. Laboratory, M W 2–4:30. Recitation to be arranged. Stocking 119. Assistant Professor JORDAN and Mr. HOEFER.

Engineering aspects of dairy-plant operations and a study of dairy-plant forms and records used in inventory control.

DAIRY BACTERIOLOGY. (See Bacteriology.)

210. *SPECIAL TOPICS IN DAIRY CHEMISTRY.* Fall term. Credit one hour. Registration by permission. Time to be arranged. Professor HERRINGTON.

The class undertakes, by cooperative effort, to prepare a comprehensive, written review of some topic in the field of dairy chemistry. The subject for review is changed each term and graduate students may register indefinitely.

[220. *CHEMISTRY OF MILK PRODUCTS.* Spring term. Credit four hours. Prerequisite, course 113. Professor ———.] Not given in 1954–55.

An advanced consideration of the chemical physical aspects of milk products.

251. *SPECIAL PROBLEMS IN DAIRY SCIENCE.* Fall or spring term. Credit one or more hours, by arrangement. For advanced students. Assistant Professor JORDAN.

Special problems in any phase of dairy science may be elected.

252. *SEMINAR.* Fall and spring terms. Time to be arranged. Stocking. Staff.

DRAWING

MECHANICAL

1. *MECHANICAL DRAWING.* Fall or spring term. Credit three hours. Lectures, T Th 8. Stocking 119. Laboratory: fall term, W 1–5 or Th 1–5; spring term, W 1–5. Stocking 410. Limited to 24 students per laboratory. Book and supply lists are available at the book stores. Mr. FURRY.

A course dealing with graphic presentation. The work includes lettering; use of instruments; orthographic projection involving plans, elevations, and sections; isometric drawing; auxiliaries, and the practical applications of these principles to simple problems.

2. *ADVANCED MECHANICAL DRAWING.* Spring term. Credit three hours. Prerequisite, course 1 or sufficient high school drawing. Lectures, W F 8. Stocking 119. Laboratory, Th 1–5. Stocking 410. Limited to 24 students per laboratory. Book and supply lists are available at the book stores. Mr. FURRY.

A continuation of course 1 with work on machine drawing, including assembly drawings; intersections; developments; descriptive geometry; sectional and auxiliary views; and the use of conventional symbols.

FREEHAND DRAWING AND ILLUSTRATION

10. *DRAWING FOR LANDSCAPE STUDENTS.* Throughout the year. Credit two hours a term. First term, W F 1:40–4:30; second term, M W F 11–1. Mann 500. Assistant Professor BURCKMYER and Mr. LAMBERT.

A course planned to develop (1) practical ability in the sketching of outdoor planting and landscaped features; (2) facility in lettering, in isometric and perspective drawing.

11. *FREEHAND DRAWING.* Fall or spring term. Credit three hours. For beginning students. Lecture, T or W 10. Laboratory, five hours of practice to be scheduled between 9 and 12 M T W Th F, or T 2–4. Mann 500. Assistant Professor BURCKMYER and Mr. LAMBERT.

The objective is to develop accuracy of observation and skill in delineation. Practice is given in outdoor sketching and in the drawing of interior scenes, figures, and subjects within the students' special fields of interest. The principles of freehand perspective are taught and applied. The course is designed to aid those who plan to work in nature study, biological sciences, and home economics.

12. *FREEHAND DRAWING AND ILLUSTRATION.* Fall term. Credit three hours. Prerequisite, course 11 or the equivalent. Lecture, M or Th 10. Practice, five hours to be scheduled between 9 and 12 M T W Th F or on T 2–4. Mann 500. Assistant Professor BURCKMYER and Mr. LAMBERT.

This course carries on from the object drawing of the beginning course to the organization of a complete illustration. The subject matter is derived largely from quick, on-the-spot sketches. Composition, perspective relationships, and ways of rendering are all considered. The work is planned primarily to help students who expect to use their sketching ability in landscape work, interior decorating, and in the illustrating of their own papers, bulletins, and books.

14. *WATER COLOR ILLUSTRATION.* Spring term. Credit two hours. Prerequisite, course 11 or the equivalent. Six hours of practice must be scheduled between 9 and 12 M T W Th F S or T 2–4. Mann 500. Assistant Professor BURCKMYER and Mr. LAMBERT.

The student learns to mix colors, lay washes, and plan the values of his composition before he tries illustration in color.

16. *SPECIAL PROBLEMS.* Fall or spring term. Credit two hours. For advanced students. Three hours of practice required for each hour of credit. Prerequisite, course 10, 12, or the equivalent. Mann 500. Assistant Professor BURCKMYER and Mr. LAMBERT.

For students who wish to attain proficiency in some particular type of illustration or technique.

17. *SCIENTIFIC ILLUSTRATION.* Spring term. Credit two hours. Prerequisite, course 11 or permission of the instructor. Six hours of practice to be scheduled between 9 and 12 M T W Th F or on T 2–4. Mann 500. Assistant Professor BURCKMYER.

This course surveys illustration methods suitable for different scientific fields and gives training in the techniques of pen and ink, scratch board, stipple board, wash, and Bourges overlays. Instruction is given in the use of the camera lucida. Methods of reproducing illustrations are studied with relation to cost and problems of publication.

ENTOMOLOGY AND LIMNOLOGY

For related work see the courses listed under the heading "Conservation" in this *Announcement,* and under "Zoology" in the *Announcement of the College of Arts and Sciences.*

BIOLOGY

1. *GENERAL BIOLOGY.* Fall and spring terms. Credit three hours a term. The course may be started in either term. Not open to students who have had both Zoology 104 and Botany 1. If Biology 1 is taken after either Zoology 104 or Botany 1, credit two hours a term. Lectures and demonstration, M W 9 or 11. Roberts 392. One laboratory a week, M T W Th or F 2–4:30 or T 10–12:20. Roberts 301 and 302. Professor HOOD and assistants.

An elementary course planned to meet the needs of students majoring outside of the plant and animal sciences; particularly adapted as the first year of a two-year sequence in biology for the prospective teacher of general science in the secondary schools. The course deals with the nature of life, life processes, the activities and origin of living things. It covers the organization of representative plants and animals, including man as an organism, and the principles of nutrition, growth, behavior, reproduction, heredity, and evolution.

9. *BIOLOGICAL BASIS OF SOCIAL PROBLEMS.* Spring term. Credit three hours. Not to be taken as a substitute for, or after, Biology 1. No prerequisite. Lectures and demonstration, T Th S 9. Roberts 392. Associate Professor UHLER.

An elementary course designed especially to furnish a background in biological science for students in the College of Home Economics who intend to enter the field of nursery-school teaching, though open to other interested students as well. A survey course of biological principles, with emphasis on human structure, development, heredity, and eugenics.

105. *LABORATORY METHODS IN BIOLOGY.* Fall term. Credit three hours. Prerequisite, Biology 1, Botany 1, or Zoology 102 or 104. Lecture and laboratory,

T or F 10–12:30, and additional periods by appointment. Roberts 306. Associate Professor UHLER.

For students who intend to teach or to follow some phase of biology as a profession. Subjects covered: collection, preservation, and storage of materials; the preparation of bird and mammal skins for study; injection of blood vessels and embalming; clearing and staining of small vertebrates; protozoological methods; and the preparation and staining of smears, whole mounts, and sectional materials.

GENERAL ENTOMOLOGY

Students are accepted as majors in entomology only upon the consent of the head of the Department or of a member of the staff designated to act for him. Except in certain fields, this will normally be done only at the end of the sophomore year. Certain prescribed courses are required, and a high scholastic average is expected.

10. *INTRODUCTORY ENTOMOLOGY.* Fall or spring term. Credit three hours. Lectures: fall term, W F 11; spring term, T Th 9. Comstock 245. Laboratory: fall term, W Th or F 2–4:30; spring term, M T W Th or F 2–4:30. Comstock 100. Professor WATKINS and assistants.

A survey of the structure, biology, and classification of insects; types of insect control; and the major groups of insecticides, their formulation and application. Laboratory exercises on the anatomy and biology of insects, with practice in the identification of representative forms including many of the commoner species of economic importance.

[116. *INSECT ECOLOGY.* Fall term. Credit three hours. Given in alternate years. Prerequisite, Biology 1 or Zoology 102 or 104, and course 10 or the equivalent. Professor PALM.] Not given in 1954–55.

A study of insects in relation to their environment, with special attention given to the applied aspects of insect ecology. Field and laboratory work provide an opportunity for color photography with insects.

[218. *TECHNICS OF BIOLOGICAL LITERATURE.* Fall term. Credit two hours. Given in alternate years. Associate Professor FRANCLEMONT.] Not given in 1954–55.

History of the development of entomological literature and a critical study of the biologists' works of reference. Practice in the use of indices and bibliographies, and practice in the preparation of the latter.

INSECT MORPHOLOGY

222. *INSECT MORPHOLOGY, ANATOMY, AND HISTOLOGY.* Fall and spring terms. Credit three hours a term. Prerequisite, course 10 or the equivalent. Lecture, T 10. Comstock 145. Laboratory, M W 2–4:30. Comstock 270. Associate Professor BUTT.

A study of external and internal anatomy of insects. Laboratories include gross dissection and histological studies of internal organs of representative insects.

223. *INSECT EMBRYOLOGY AND POSTEMBRYONIC DEVELOPMENT.* Spring term. Credit two hours. Prerequisite, course 222. Hours by arrangement. Associate Professor BUTT.

Lectures with assigned reading and reports by students.

224. *INSECT HISTOLOGY: TECHNIQUE.* Fall or spring term. Credit two hours. Prerequisite, course 222. Two laboratories a week by appointment. Comstock 265. Associate Professor BUTT.

The technique of preparing, sectioning, and mounting insect tissues for study.

INSECT TAXONOMY

130. *INTRODUCTORY INSECT TAXONOMY.* Spring term. Credit three hours. Prerequisite, course 10. Lecture, Th 10. Comstock 300. Laboratory, T Th 2–4:30. Comstock 300. Assistant Professor EVANS.

An introduction to the classification, nomenclature, and distribution of insects. Laboratory practice in the identification of orders, families, and representative genera of insects; methods of collection and preparation of insect specimens. Field trips are taken in the late spring.

[231. *TAXONOMY OF INSECTS EXCLUSIVE OF THE LARGER ORDERS OF HOLOMETABOLA.* Fall term. Credit four hours. Given in alternate years. Prerequisite, course 130. Assistant Professor EVANS.] Not given in 1954–55.

Lectures on the classification, bionomics, and evolution of the orders and families of insects, exclusive of the larger orders of Holometabola. Laboratory studies on the literature and on the characters and classification of representative genera and species. Continuation of taxonomy of Holometabola is in courses 232, 233, and 234.

232. *TAXONOMY OF THE IMMATURE STAGES OF HOLOMETABOLA.* Fall term. Credit three hours. Given in alternate years. Prerequisite, courses 130 and 231 or permission of the instructor. Lecture, F 10. Comstock 300. Laboratory, F 2–4:30; and one other by arrangement. Comstock 300. Assistant Professor EVANS and Associate Professor FRANCLEMONT.

Lectures on the structure and habits of insect larvae. Laboratory studies of the literature, comparative morphology, and identification of the immature stages of the Holometabola.

[233. *TAXONOMY OF THE HOLOMETABOLA: COLEOPTERA AND DIPTERA.* Spring term. Credit three hours. Given in alternate years. Prerequisite, courses 130 and 231 or permission of the instructor. Assistant Professor EVANS and Associate Professor FRANCLEMONT.] Not given in 1954–55.

Lectures on the classification, bionomics, and evolution of the Coleoptera and Diptera. Laboratory studies on the literature and on the characters and classification of representative genera and species of these orders.

234. *TAXONOMY OF THE HOLOMETABOLA: LEPIDOPTERA AND HYMENOPTERA.* Spring term. Credit three hours. Given in alternate years. Prerequisite, courses 130 and 231 or permission of the instructor. Lecture, F 10. Comstock 300. Laboratory, F 2–4:30 and one by arrangement. Comstock 300. Associate Professor FRANCLEMONT and Assistant Professor EVANS.

Lectures on the classification, bionomics, and evolution of the Lepidoptera and Hymenoptera. Laboratory studies on the literature and on the characters and classification of representative genera and species of these orders.

235. *PROCEDURES IN TAXONOMY.* Fall term. Credit two hours. Given in alternate years. Prerequisite, course 130. Lectures, T Th 9. Comstock 300. Associate Professor FRANCLEMONT.

A study of zoological nomenclature; the preparation of taxonomic papers, including descriptions, keys, and illustrations; methods of analyzing taxonomic data.

ECONOMIC ENTOMOLOGY

141. *GENERAL ECONOMIC ENTOMOLOGY.* Fall term. Credit three hours. Prerequisite, course 10 or the equivalent. Lectures, T Th 9. Comstock 145. Laboratory, T 2–4:30. Comstock 100. Professor WATKINS and assistants.

Lectures on the life histories and habits of insects injurious to the major plant and animal crops of the United States, and on methods used in their control; laboratory exercises on the commoner pests and more important insecticides.

241. *SPECIAL TOPICS IN ECONOMIC ENTOMOLOGY.* Fall term. Credit three hours. Given in alternate years. Prerequisite, course 141 or permission to register. Lectures, M W 11. Comstock 145. Laboratory, F 11–1. Comstock 100. Professor SCHWARDT and Associate Professor GYRISCO.

A course for graduate and advanced undergraduate students dealing with fundamental principles of insect control, with discussion of some of the major problems in agricultural entomology. Topics covered: insect pests of livestock and of stored grain and forage crops.

242. *SPECIAL TOPICS IN ECONOMIC ENTOMOLOGY.* Spring term. Credit three hours. Given in alternate years. Prerequisite, course 141 or permission to register. Lectures, M W 11. Comstock 145. Laboratory, F 11–1. Comstock 100. Associate Professors BRANN and DEWEY.

A continuation of course 241. Topics treated; insecticide application equipment; and insect pests of fruit.

[243. *SPECIAL TOPICS IN ECONOMIC ENTOMOLOGY.* Fall term. Credit three hours. Given in alternate years. Prerequisite, course 141 or permission to register. Professor RAWLINS and Assistant Professor EVANS.] Not given in 1954–55.

A continuation of courses 241 and 242. Topics covered; biological control; legislative entomology; and insect pests of vegetable crops.

[244. *SPECIAL TOPICS IN ECONOMIC ENTOMOLOGY.* Spring term. Credit three hours. Given in alternate years. Prerequisite, course 141 or permission to register. Assistant Professor NAEGELE and Associate Professor MATTHYSSE.] Not given in 1954–55.

A continuation of courses 241, 242, and 243. Topics covered: insects pests of woody ornamentals, forests, and turf; and insect pests of commercial florist crops and herbaceous ornamentals.

PARASITOLOGY AND MEDICAL ENTOMOLOGY

[151. *PARASITOLOGY.* Spring term. Credit three hours. Given in alternate years. Prerequisite, Biology 1 or Zoology 102 or 104. Course 10 is also recommended. Professor TRAVIS.] Not given in 1954–55.

A study of the principal protozoan and helminth parasites of man and other vertebrates, with special emphasis given to life histories and recognition.

152. *MEDICAL ENTOMOLOGY.* Fall term. Credit three hours. Given in alternate years. Prerequisite, Biology 1 or Zoology 102 or 104. Course 10 is recommended. Lecture, W 10. Comstock 200. Laboratory, Th 2–4:30 and S 10:30–1. Comstock 200. Professor TRAVIS.

A study of insects and other arthropods that are the causative agents of disease in man and other animals, or are the vectors, or are the intermediate hosts of disease-producing organisms. Laboratory studies stress life histories and recognition.

154. *WILDLIFE PARASITOLOGY.* Fall term. Credit two hours. Given in alternate years. For qualified graduate and undergraduate students with a special interest in the parasites of wildlife. Prerequisite, permission to register. Lecture, T 9. Comstock 200. Laboratory, Th 10–12:30. Comstock 200. Professor TRAVIS.

A technical course that stresses the life histories and the recognition of parasites associated with wildlife species.

[253. *PARASITOLOGY TECHNIQUES.* Spring term. Credit two hours. Given in alternate years. Prerequisite, course 151 or may be taken concurrently with course 151. Undergraduates by permission. Professor TRAVIS.] Not given in 1954–55.

A laboratory study of the techniques used by research and practical workers in the field of parasitology.

255. *MEDICAL ENTOMOLOGY TECHNIQUES.* Fall term. Credit two hours. Given in alternate years. Prerequisite, course 152 or may be taken concurrently with course 152. Undergraduate students by permission. Lecture, F 11. Comstock 200. Laboratory, F 2–4:30. Comstock 200. Professor TRAVIS.

A laboratory study of the techniques used by research and practical workers in the field of medical entomology.

APICULTURE

Advanced and graduate students taking courses 222 and 223 and specializing in apiculture are permitted to use the honeybee as illustrative material in the laboratory work of these courses.

61. *INTRODUCTORY BEEKEEPING.* Spring term. Credit two hours. Lectures, T Th 11. Comstock 245. Professor DYCE.

This course is intended to afford a general knowledge of the fundamentals of beekeeping, including the life history, instincts, and general behavior of honeybees. Special attention is given to the role of bees in the cross-pollination of agricultural crops, as well as production of honey and beeswax.

[261. *ADVANCED BEEKEEPING.* Throughout the year. Credit three hours a term. Given in alternate years. Prerequisite, courses 10 and 61 and previous beekeeping experience. Professor DYCE and Associate Professor COGGSHALL.] Not given in 1954–55.

An advanced course for those specializing in apiculture. Considerable time is devoted to a study of the entire field of beekeeping. Laboratory work covers bee behavior, external and internal anatomy, disease diagnosis, honey and beeswax production, and preparation for market, and the management of colonies for pollination service.

262. *SPECIAL TOPICS IN BEEKEEPING.* Throughout the year. Credit three hours a term. Given in alternate years. Registration by permission; open to qualified juniors, seniors, and graduate students. By appointment. Professor DYCE and Associate Professor COGGSHALL.

A technical course designed for advanced students, and covering scientific investigation in all phases of the subject. Special attention is given to improved methods of apiary and honey-house management and the preparation of honey for market. Current literature on beekeeping is assigned, reviewed, and evaluated by students. Lectures and discussions are supplemented by field trips.

LIMNOLOGY

171. *LIMNOLOGY.* Fall term. Credit three hours. Prerequisite, nine hours of biological science, a course in general physics, and a course in general chemistry. Lecture, F 10. Comstock 145. Laboratory and field trips, F 2–4:30 and S 8–10:30. Comstock 110. Associate Professor BERG.

The ecology of streams, lakes, and ponds, and conditions that determine their productivity.

272. *ADVANCED LIMNOLOGY.* Spring term. Credit three hours. Prerequisite, course 171 and permission to register. Lecture, Th 11. Comstock 145. Laboratory and field trips, F 2–4:30 and S morning by arrangement. Comstock 110. Associate Professor BERG.

A quantitative treatment of the problem of the productivity of inland waters.

FISHERY BIOLOGY AND FISH CULTURE. See full description under "Conservation."

INSECT PHYSIOLOGY

[285. *INSECT PHYSIOLOGY.* Fall term. Credit five hours. Given in alternate years. Prerequisite, course 222, Chemistry 106, and Physics 104 or 108. Professor PATTON.] Not given in 1954–55.

An introductory course for upperclassmen and graduate students. The physiology of insect systems is discussed and demonstrated by a series of laboratory exercises.

INSECT TOXICOLOGY

295. *CHEMISTRY AND TOXICOLOGY OF INSECTICIDES.* Fall term. Credit six hours. Given in alternate years. Prerequisite, general chemistry and organic chemistry. Undergraduate students by permission. Lectures, M W F 9. Comstock 145. Laboratory, M W 2–4:30 or T Th 9–11:30. Comstock 50. Discussion period to be arranged. Associate Professor DEWEY and ———.

The fundamental chemical and physical properties of insecticides and the principles of evaluating their effects on insects.

RESEARCH

300–399. *RESEARCH.* Fall and spring terms. Credit to be arranged. Prerequisite, permission to register from the professor under whom the work is to be taken. Comstock or Roberts.

307. *BIOLOGY.* Professor HOOD and Associate Professor UHLER.

310. *INSECT ECOLOGY.* Professor PALM.

320. *INSECT MORPHOLOGY, HISTOLOGY, AND EMBRYOLOGY.* Associate Professor BUTT.

330. *TAXONOMY.* Professor HOOD, Associate Professors DIETRICH and FRANCLEMONT, and Assistant Professor EVANS.

340. *ECONOMIC ENTOMOLOGY.* Professors PALM, SCHWARDT, LEIBY, RAWLINS, and WATKINS; Associate Professors BRANN, DEWEY, MATTHYSSE, GYRISCO, and LAPLANTE.

350. *MEDICAL ENTOMOLOGY AND PARASITOLOGY.* Professor TRAVIS.

361. *APICULTURE.* Professor DYCE and Associate Professor COGGSHALL.

370. *LIMNOLOGY.* Associate Professor BERG.

385. *INSECT PHYSIOLOGY.* Professor PATTON.

395. *INSECTICIDAL CHEMISTRY.* ———.

399. *INSECT TOXICOLOGY.* Associate Professor DEWEY.

SEMINAR

JUGATAE. Fall and spring terms. M 4:30–5:30. Comstock 245.

The work of an entomological seminar is conducted by the Jugatae, an entomological club that meets for a discussion of the results of investigations by its members.

EXTENSION TEACHING

1. *ORAL AND WRITTEN EXPRESSION.* Throughout the year. Credit three hours a term. Primarily for students of the two-year courses. Lectures and practice: fall term, M W F 8 or 11 or T Th S 10; spring term, M W F 8, 9, or 11. Warren 231. Criticism, by appointment, daily 8–5 and S 8–1. Associate Professor FREEMAN, Assistant Professor MARTIN, and Messrs. LUEDER and ———.

Practice in oral and written presentation of topics in agriculture, with criticism

and individual appointments on the technique of public speech. Designed to encourage interest in public affairs, and, through demonstrations and the use of graphic materials and other forms, to train for effective self-expression in public. Special training is given to competitors for the Eastman Prizes for Public Speaking and the Rice Debate Stage. In addition, some study is made of representative work in English literature. Part of the work in the second term is a study of parliamentary practice

101. *ORAL AND WRITTEN EXPRESSION.* Fall or spring term. Credit two hours. Open to juniors and seniors. The number in each section is limited to twenty students. Lectures and practice: fall term, M W 9, T Th 9, 10, or 11, W F 10, Warren 131; spring term, M W 9, T Th 9 or 11, Warren 131. Criticism, by appointment, daily 8–5, S 8–1. Professor PEABODY, Associate Professor FREEMAN, Assistant Professor MARTIN, and Mr. LUEDER.

Practice in oral and written presentation of topics in agriculture, with criticism and individual appointments on the technique of public speech. Designed to encourage interest in public affairs, and, through demonstrations and the use of graphic material and other forms, to train for effective self-expression in public. Special training is given to competitors for the Eastman Prizes for Public Speaking and in the Rice Debate contest. (See page 106.)

102. *ORAL AND WRITTEN EXPRESSION.* Spring term. Credit two hours. Prerequisite, course 101, of which course 102 is a continuation. Lectures and practice, T Th 10 or W F 10. Warren 131. Criticism, by appointment, daily 8–5, S 8–1. Professor PEABODY and Associate Professor FREEMAN.

A part of the work of the course consists of a study of parliamentary practice.

104. *ADVANCED ORAL EXPRESSION.* Spring term. Credit two hours. Prerequisite, courses 101 and 102 and the permission of the instructor. Limited to nine students. M W 12. Warren 31. Professor PEABODY.

An advanced course of study and practice in oral expression as directly related to the needs of the county agricultural agent, the home demonstration agent, the 4-H Club agent, and the extension specialist.

JOURNALISM

15. *AGRICULTURAL AND HOME ECONOMICS JOURNALISM.* Fall term. Credit three hours. M W F 10. Warren 231. Professor WARD.

An introductory course dealing with the farm press, daily and weekly newspapers, magazines, trade journals, book publishing, advertising, radio, television, and other fields related to agricultural and home economics journalism. The operations of the major mediums of communication and the techniques of writing for each are studied.

110. *NEWS WRITING.* Spring term. Credit two hours. Prerequisite, course 15. Th 2–4. Warren 232. Associate Professor KNAPP.

Primarily the writing of agricultural and home-economics news for publication. The course includes criticisms, discussions, and consultations on published material written by students.

[112. *AGRICULTURAL ADVERTISING AND PROMOTION.* Spring term. Credit two hours. Open to juniors and seniors, and to other students by permission of the instructor. Professor WARD and guest lecturers from advertising agencies.] Not given in 1954–55.

The use of commercial advertising and sales promotion methods and media in promoting the sale of products and new or improved farm and home practices and programs. Includes market analysis, planning of the advertising and/or promotion units, selection of media, preparation of copy, and sales-promotion pieces.

113. *WRITING FOR MAGAZINES.* Spring term. Credit two hours. Not open to freshmen. M 2–4. Warren 260. Professor WARD.

A course dealing chiefly with the writing of fact articles for publication in agricultural, home economics, or general magazines. Students may write on any subjects they choose. The articles and publication markets are analyzed.

RADIO – TELEVISION

120. *RADIO BROADCASTING AND TELECASTING.* Spring term. Credit three hours. Not open to freshmen. M W F 9. Warren 145. Associate Professor KAISER, Mr. RICHARDS, and Mrs. GABRIEL.

An introductory course to familiarize students, particularly those in agriculture and home economics, with the best methods of presenting ideas by radio and television. Practice includes auditions and criticisms for all members of the class in preparing and presenting radio talks; continuity writing and program arrangements.

121. *FARM AND HOME RADIO PRODUCTION AND PROGRAMMING.* Fall term. Credit two hours. Prerequisite, course 120 or permission of the instructor. T 2–4. WHCU Campus Studio. Associate Professor KAISER and staff.

A comprehensive course in farm and home radio wiring, program planning, and presentation. The course covers the actual gathering and correlating of material, transcribing, and discussion of results. Students are assigned regular program problems which they will carry through to completion. Field work is handled with wire and tape recorders. A television seminar is to be arranged.

VISUAL AIDS

130. *PHOTOGRAPHY.* Spring term. Credit two hours. Lectures and laboratory, S 9–12. Roberts 131. Open to juniors, seniors, and graduate students. Limited to twenty-five students. Registration by permission only. Primarily intended for those who plan to enter fields of agriculture and home economics in which a knowledge of photographic principles is important. Associate Professor E. S. PHILLIPS and Messrs. MAURER and TURNER.

A course that deals with the techniques of photography to be used in newspapers, magazines, bulletins, and for film strips, motion pictures, and other media.

131. *VISUAL AIDS: THEIR SCOPE, PREPARATION, AND USE.* Fall term. Credit two hours. Lecture and demonstration, S 9–11. Roberts 392. Open to juniors, seniors, and graduate students. Associate Professor E. S. PHILLIPS and departmental staff.

A course designed to familiarize the student with the forms, purposes, preparation, and use of all types of visual aids (slide sets, motion and news photography, exhibits, posters, and other media), useful to teaching, promotion, or public-relations problems in agriculture and home economics. Includes practice in selection of and planning specifically assigned problems.

EXTENSION ORGANIZATION AND METHODS

140. *EXTENSION ORGANIZATION, ADMINISTRATION, AND POLICY.* Spring term. Credit three hours. Open to graduate students and seniors, and to juniors by special arrangement. Students who have not been following the curriculum for extension workers should consult the instructor before registering. Lectures and exercises based on current extension work. M W F 11. Warren 201 Professor KELSEY and others.

This course is designed to familiarize students with the organization, administration, methods, and policies of extension work as exemplified in New York State. It is for students interested in voluntary leadership in extension as well as for prospective county agricultural agents, county 4-H Club agents, or other ex-

tension workers in agriculture. *(See* also Homemaking Education courses in the College of Home Economics.)

FLORICULTURE AND ORNAMENTAL HORTICULTURE

Instruction in the Department of Floriculture and Ornamental Horticulture is planned for students with the following interests: (1) commercial plant production, distribution, or utilization, including the management of greenhouses, nurseries, and wholesale and retail establishments; (2) developing a landscape service, including the planning, construction, planting, and maintenance of small properties (these students are expected to register for one summer session); (3) superintendence of parks, golf courses, cemeteries, or of private estates; (4) the culture and use of ornamental plants in the home garden and in the home.

Special curricula are set up to meet the needs of those students desiring training in the above fields.

Undergraduate students may plan their course as preparation for graduate training leading to university teaching, or research positions with universities, experiment stations, or industry.

Courses 1, 2, 10, 12, 13, 115, and 123 are required of all students majoring in the Department. These students must also satisfy the Department practice requirement based on experience with ornamental plants and their culture.

GENERAL COURSES

1. *GENERAL FLORICULTURE AND ORNAMENTAL HORTICULTURE.* Fall term. Credit three hours. Intended primarily for department majors. Those desiring a course in general horticulture should register for Vegetable Crops 3. Lectures, M W 10. Plant Science 37. Laboratory, T W or Th 2–4. Plant Science 15. Professor MACDANIELS and Mr. ———.

An elementary course covering the principles and practices of growing ornamental plants in the garden, greenhouse, and home.

2. *INTRODUCTION TO LANDSCAPE DESIGN.* Spring term. Credit three hours. Lectures, M W F 9. Plant Science 233. Associate Professor PORTER.

A consideration of the principles of landscape design as applied to the small-residence property.

5. *FLOWER ARRANGEMENT.* Fall or spring term. Credit two hours. Fall term: lecture, M 10, Plant Science 141; laboratory, M 2–4:30, T or W 10–12:30, Plant Science 22. Mrs. Fox. Spring term: lecture, T 10, Plant Science 37; laboratory, T or W 2–4:30 or Th 10–12:30, Plant Science 22. Mr. Fox.

A study of the principles and methods of arranging flowers and other plant materials for decorative use in the home and for exhibition.

PLANT MATERIALS

10. *TAXONOMY OF CULTIVATED PLANTS.* Fall term. Credit four hours. Intended primarily for students majoring in floriculture. Prerequisite, Botany 1 or its equivalent. Lectures, W F 11. Plant Science 37. Laboratory, T Th or W F 2–4:30. Plant Science 22. Assistant Professors DRESS and LEE.

A study of the kinds of cultivated ferns and seed plants and their classification into families and genera. Emphasis is placed on methods of identification, the preparation and use of the analytical keys, the distinguishing characteristics of the families concerned and their importance in ornamental horticulture.

12. *HERBACEOUS PLANT MATERIALS.* Spring term. Credit three hours. Prerequisite, course 10 or permission to register. Should be followed by summer session course in Herbaceous Plant Materials. Lectures, T Th 8. Plant Science 37. Laboratory, W 10–12:30 or 2–4:30. Plant Science 15. Assistant Professor LEE.

A study of the ornamental herbaceous plants used in landscape and garden plantings. Emphasis is placed on the identification, use, and culture of spring-flowering bulbs and perennials. The class visits Rochester parks and gardens in late May.

13. *WOODY-PLANT MATERIALS.* Spring term. Credit four hours. Prerequisite, course 10 or permission to register. Lectures, T Th 9. Plant Science 37. Laboratory and field trips, M and W or F 2–4:30. Plant Science 29. Associate Professor CORNMAN.

A study of the trees, shrubs, and vines used in landscape planting. Emphasis is placed on their characteristics and values for use as landscape material. The class visits Rochester parks and gardens.

[113. *WOODY PLANT MATERIALS, ADVANCED COURSE.* Fall term. Credit two hours. Prerequisite, course 13. Associate Professor CORNMAN.] Not given in 1954–55.

A course dealing with the important groups of landscape materials and the literature of the subject. A knowledge of the ordinary woody plants for landscape use in the Northeast is presumed. Emphasis is on less-known northern plants and upon plant groups basic in landscape design in other regions of the United States. Opportunities for practice in the determination of unknowns and in the use of the literature are provided. A trip is taken to the Rochester parks.

NURSERY MANAGEMENT

[114. *TURF.* Spring term. Credit two hours. Given in alternate years. Prerequisite, Agronomy 1 and permission to register. Associate Professor CORNMAN.] Not given in 1954–55.

A course dealing chiefly with the principles, practices, and materials for the construction and maintenance of lawn areas. Some attention is given sports turf. A week-end inspection trip is taken to experimental test plots and special turf areas.

115. *PLANT PROPAGATION.* Fall term. Credit three hours. Prerequisite, courses 12 and 13 and Botany 31 or the equivalent, or permission of the instructor. Lectures, T Th 8. Plant Science 37. Laboratory, Th 2–4:30. Greenhouses and nurseries. Associate Professor SNYDER.

A study of the principles and methods involved in the propagation of woody and herbaceous plants by seeds, division, layers, cuttings, budding, and grafting. The class visits nurseries at Geneva and Newark, New York.

117. *COMMERCIAL NURSERY MANAGEMENT.* Spring term. Credit three hours. Prerequisite, course 115. Lectures, T F 11. Plant Science 37. Laboratory, T 2–4:30. Greenhouses and nurseries. Associate Professor PRIDHAM.

A course supplementary to 115 dealing with the problems of the commercial propagation and growing of nursery plants. Pruning, digging, storage, and packaging of nursery stock are considered. Trips are made to near-by commercial nurseries.

[119. *PLANTING AND MAINTENANCE OF ORNAMENTAL PLANTS.* Fall term. Credit three hours. Prerequisite, course 115. Associate Professor PRIDHAM.] Not given in 1954–55.

A study of the principles and practices employed in the maintenance of ornamental plants, including soil relationships, planting, watering, cultivation, pruning, and winter protection of landscape plant materials in garden and park planting. Both woody and herbaceous materials are considered. Field problems and observational trips are conducted.

COMMERCIAL FLORICULTURE

123. *FLORIST CROP PRODUCTION.* Fall term. Credit four hours. Prerequisite, course 115, Botany 31, Agronomy 1, and the practice requirement. Lectures

and recitations, M W F 9. Plant Science 37. Laboratory, M 2–4:30. Greenhouses. Professor POST.

A comprehensive study of the application of basic science to the culture of ornamental plants, particularly under greenhouse conditions. A trip is taken to greenhouses in Rome and Utica, New York.

124. *COMMERCIAL GREENHOUSE PRODUCTION.* Spring term. Credit three hours. Prerequisite, course 123. Lectures, M W 9. Plant Science 37. Laboratory, W 2–4:30. Greenhouses. Assistant Professor ANDREASEN.

A course supplementary to course 123 dealing with the commercial production of florist crops; emphasis is upon the practical problems concerned. Several trips are made to near-by commercial greenhouses.

125. *FLOWER-STORE MANAGEMENT.* Spring term. Credit two hours. Prerequisite, course 5 and permission to register. Lecture, W 11. Plant Science 37. Laboratory, M 2–4:30. Plant Science 22. Mrs. Fox.

Lectures devoted to flower-shop management, business methods, merchandising, and marketing of floricultural commodities. Laboratories to include the application of subject matter and the principles of commercial floral arrangement and design. A trip made to New York City includes the flower shops, retail florist establishments, and the New York Flower Market.

LANDSCAPE SERVICE

32. *ELEMENTARY DESIGN AND PLANTING OF SMALL PROPERTIES.* Fall term. Credit three hours. Open to general election. Prerequisite, courses 2 and 13 and Drawing 10. Lecture, F 12. Laboratory, M F 2–4:30. Plant Science 433. Associate Professor PORTER.

The application of the principles of design to the specific problems of the small-residence property as related to both planning and planting.

132. *LANDSCAPE PLANNING AND PLANTING OF SMALL PROPERTIES.* Fall and spring terms. Credit four hours a term. Intended for advanced students. Not open for general election. Prerequisite, courses 12 and 32. Lecture, T 12. Laboratory: fall term, T Th 2–4:30 and three additional hours; spring term, W Th 2–4:30 and three additional hours. Plant Science 433. Associate Professor PORTER and Assistant Professor CARES.

A study of the design and planting of small properties.

134. *NURSERY-LANDSCAPE CONSTRUCTION AND ESTIMATING.* Fall term. Credit three hours. Intended for advanced students specializing in landscape service. Must be taken with course 132. Lecture, Th 9. Laboratory, M Th 10–12:30. Plant Science 433. Assistant Professor CARES.

DEPARTMENTAL SEMINAR

241. *SEMINAR.* For departmental staff and graduate students. Fall and spring terms. Time to be arranged.

FOOD SCIENCE AND TECHNOLOGY

A program of instruction has been arranged for students interested in the food industry. It combines courses in the sciences, various aspects of economics, food technology, and related subjects. A faculty adviser assists these students both in arranging their class schedules and in obtaining employment that will lead to experience appropriate to their objective and that may count toward the fulfillment of the practice requirement.

Although Food Science and Technology is the name of a division in the New York State Agricultural Experiment Station at Geneva, it has not been applied to a teaching department in this College. Courses that might come logically under

the heading of Food Science and Technology are found in a number of departments in the College of Agriculture or in other departments of the University. For example, Principles of Food Preservation is course 130 in the Department of Biochemistry; courses in Bacteriology are found under the heading of Bacteriology; courses dealing with vegetables and fruits are found among the offerings, respectively, of the Departments of Vegetable Crops and Pomology; courses in the manufacture and processing of dairy products are listed under the Department of Dairy Industry; and courses in Chemistry are described in the *Announcement of the College of Arts and Sciences.*

1. *THE FOOD INDUSTRY.* Fall term. Credit three hours. For freshmen and sophomores; no credit for others. Lectures, M W F 10. Savage 145. Assistant Professor CLARK.

A survey course to orient the student in the broad field of food processing. Lectures by various specialists on the staff cover the economic importance of the food industry and the relation of production and handling of the raw products to the quality of the processed foods. Emphasis is placed on the great variety of work and basic science training involved in the production, processing, and distribution of quality foods.

COURSES IN THE COLLEGE OF ENGINEERING OFFERED FOR NONENGINEERING STUDENTS*

ENGINEERING IN FOOD PROCESSING (ENGINEERING 3510). Fall term. Credit three hours. Prerequisite, college physics and chemistry. Primarily for student in the College of Agriculture and School of Nutrition. Not open to engineering students. Lecture-recitations, T Th S 9. Warren 245. Professor ERDMAN.

An introduction to engineering principles of construction and operation of mechanical and electrical equipment used in the preservation and storage of foods.

ELEMENTARY CHEMICALS ENGINEERING (ENGINEERING 5110). Spring term. Credit three hours. Prerequisite, Engineering 3510. Primarily for students in agriculture or nutrition. Not open to students in Chemical Engineering. Lectures, M W F 11. Olin 158. Associate Professor WIEGANDT.

A general discussion of the fundamental operations and processes of chemical engineering, with particular emphasis on their applications in the food-processing industries. Among the topics discussed are the unit operations of evaporation, filtration, agitation, distillation, and drying, and the general design of food-processing plants.

METEOROLOGY

1. *BASIC PRINCIPLES OF METEOROLOGY.* Fall or spring term. Credit three hours. Prerequisite, Physics 103 or one year of high school physics. Lectures, T Th 11. Plant Science 143. Laboratory, T W or Th 2–4:30. Plant Science 114. Assistant Professor JOHNSON.

Simplified treatment of the physical processes of the atmosphere that produce commonly observed weather phenomena, followed by discussions of condensation and precipitation, winds, the general and secondary circulations, air masses, fronts, and elementary climatology and micro-climatology. In the laboratory, emphasis is on common meteorological instruments and the weather map.

The course is designed for those who wish a single survey course in meteorology.

[2. *GENERAL CLIMATOLOGY.* Fall term. Credit two hours. Given in alternate years. Prerequisite, course 1.] Not given in 1954–55.

A study of the factors producing the observed variations in climate, climatic types

*These courses do not count as agricultural electives for students in the College of Agriculture.

and their distribution over the earth, and the climate of North America and the United States. Emphasis is placed on the climate of New York State and on microclimatology as it applies to agriculture.

[105. *METHODS IN CLIMATOLOGY.* Fall term. Credit three hours. Given in alternate years. Prerequisite, course 2 or permission of the instructor.] Not given in 1954–55.

Methods and limitations in the handling of climatic data.

[106. *MICROCLIMATOLOGY.* Spring term. Credit three hours. Given in alternate years. Prerequisite, course 1 or permission of the instructor.] Not given in 1954–55.

A study of factors influencing climate in the atmospheric layer directly adjacent to the earth's surface, and the variation of climate due to vegetation or small-scale topographic features.

[211. *RESEARCH.* Fall or spring term. Credit one or more hours. Prerequisite, permission of the instructor.] Not given in 1954–55.

A course designed for advanced and graduate students. Original investigations in meteorology and climatology.

[212. *SPECIAL TOPICS IN METEOROLOGY.* Fall or spring term. Credit one or more hours. Prerequisite, permission of the instructor.] Not given in 1954–55.

Study of meteorological topics more advanced than or different from those in other courses. Subject matter depends on the background and desires of those enrolling.

PLANT BREEDING

GENETICS

1. *HEREDITY AND EUGENICS.* Spring term. Credit two hours. (Students who have had course 101 are allowed oue-hour credit.) Prerequisite, Zoology 104, Botany 1, or Biology 1. Lectures, W F 10. Discussion period, M 10, attendance voluntary. Plant Science 141. Professor SRB.

An introduction to the laws of heredity, a survey of heritable characters in man, and discussions of the relationship between heredity in man and social problems.

This course is intended primarily for students who have not previously had a college course in genetics and who wish to obtain a knowledge of principles of heredity, especially as applied to man.

101. *GENETICS.* Fall term. Credit four hours. Prerequisite, a beginning course in biological science. Courses in cytology and in taxonomic botany and zoology are found helpful. Lectures, M W F 8. Plant Science 233. Laboratory, T 8–10, or M W Th or F 2–4. Plant Science 146. Associate Professor EVERETT and assistants.

A general study of the fundamental principles of genetics in plants and animals. Discussions of simple cases of inheritance, gene action and interaction, gene linkage, and the chromosome theory of heredity, inheritance of quantitative characters, inheritance of sex, effects of inbreeding and crossing, cytoplasmic inheritance, the origin of heritable variations and their relation to evolution.

Laboratory studies of hybrid material in plants and breeding experiments with Drosophila.

201. *BIOCHEMICAL GENETICS.* Spring term. Credit two hours. Prerequisite, course 101 and a course in organic chemistry. Lectures, M W 8. Plant Science 141. Professor SRB.

The nature and function of hereditary units studied in terms of physiology and biochemistry. Students are expected to do extensive reading in the periodical literature of genetics and to prepare a term paper.

204. *EXPERIMENTAL EVOLUTION.* Spring term. Credit two hours. Prerequisite, course 101 or the equivalent. Lecture, Th 10–12. One discussion period, to be arranged. Plant Science 37. Professor H. H. SMITH.

A study of factors involved in the evolution of populations, races, and species. Topics covered include variability, polygenic inheritance, population dynamics, rates, changes in genetic systems, isolating mechanisms, and the evolution of certain economic plants.

PLANT BREEDING

102. *PLANT BREEDING.* Fall term. Credit three hours. (Students who have had course 101 are allowed two hours credit.) Prerequisite, Botany 1. Lectures, T Th 8. Plant Science 141. Laboratory, S 8–10:30. Plant Science 146. Professor MURPHY.

A study of the principles and practices used in developing, evaluating, distributing, and maintaining improved crop varieties. Approximately one-third of the course is devoted to a study of elementary genetics. Designed primarily for students who wish a general knowledge of plant breeding. Students who expect to engage professionally in plant breeding should take courses 101 and 203 instead of this course. Lectures supplemented by periods in the greenhouse and experimental fields. A one-day field trip is taken.

203. *METHODS OF PLANT BREEDING.* Fall term. Credit three hours. Prerequisite, course 101, Botany 1, and a course in at least one of the following: field crops, vegetable crops, floriculture, or pomology. Lectures, T Th 9. Plant Science 141. Laboratory, T 2–4:30. Plant Science 146. Professor MUNGER.

A course designed primarily for graduate students, but open to properly qualified seniors who expect to engage in plant breeding. A study of the principles and practices of plant breeding. Lectures, supplemented by periods in the greenhouse and experimental fields. A one-day field trip is taken.

STATISTICS AND BIOMETRY

*210. *STATISTICAL METHODS I.* Fall term. Credit three or four hours. Prerequisite, graduate standing or permission of instructor. Lectures, T Th S 10. Warren 45. Laboratory, to be arranged. Associate Professor STEEL.

A simple formalization of everyday notions of odds and probability leads to a discussion of the distributions commonly encountered in the statistics applied to biology and related fields. The results, together with principles of scientific experimentation and statistical method, are applied to the conducting of experiments and the interpretation of results. The nature and validity of experimental error are thoroughly treated. Topics include analysis of variance for n-way classifications, tests of hypotheses, linear regression, correlation, treatment of discrete data, and sample surveys.

*211. *STATISTICAL METHODS II.* Spring term. Credit three or four hours. Prerequisite, course 210 or the equivalent. Lectures, T Th S 10. Warren 245. Laboratory, to be arranged. Associate Professor STEEL.

The work of course 210 is continued. Further application of the material includes randomized block and Latin square designs, analysis of covariance, analysis of variance of 2-way classifications with disproportionate numbers, factorial experiments, individual degrees of freedom, multiple and curvilinear regression, curve fitting, and new developments in statistics.

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*An additional hour per week may be devoted to algebraic derivations and manipulations associated with the statistical techniques and the computational procedures in the general lectures and laboratory period. The purpose is to give the student a better understanding of the material and a greater ability to read technical papers of statistical content without guidance. The work is required for the fourth hour of credit.

212. *EXPERIMENTAL METHODS.* Spring term. Credit one hour. Prerequisite, course 211 or the equivalent. F 2–4. Plant Science 141. Professor ATWOOD.

The use of statistical methods and experimental design in problems of plot technique and related agricultural research.

213. *DESIGN OF EXPERIMENTS.* Fall term. Credit three hours. Prerequisite, course 211 or the equivalent. M W F 8. Plant Science 141. Laboratory to be arranged. Professor FEDERER.

Plot and pen techniques, extensions and variations of the completely randomized complete block, and Latin square designs, the factorial experiment and confounding, lattice designs, crossover designs, covariance analyses, tests for ranked means, and variance component analyses.

214. *SPECIAL TOPICS.* Spring term. Credit three hours. Prerequisite, course 213 or the equivalent. M W F 8. Warren 31. Laboratory, to be arranged. Professor FEDERER.

Selected topics, depending upon the need and background of the student, from the following: long-term experiments, combination of results from several experiments, sequential experimentation, variance component analyses, estimation procedures, linear hypotheses, heritability studies, multivariate analyses, and related topics.

DEPARTMENTAL SEMINAR AND RESEARCH

150. *UNDERGRADUATE RESEARCH IN PLANT BREEDING AND GENETICS.* Fall, spring, or summer. Credit one or more hours by arrangement with instructor. Open to properly qualified seniors. Prerequisites, course 101 or 102 and permission to register. Members of the departmental staff.

222. *SEMINAR.* Fall and spring terms. Without credit. Required of graduate students taking either a major or a minor in this Department. Open to qualified seniors. F 4:30. Plant Science. Seminar Room. Members of the departmental staff.

PLANT PATHOLOGY

1. *ELEMENTARY PLANT PATHOLOGY.* Fall or spring term. Credit three hours. Prerequisite, Botany 1 or the equivalent. For graduates and undergraduates. Lecture, Th 11. Plant Science 141. Laboratory and conferences, T Th, T F, W Th, or W F 2–4:30. Plant Science 341, 343, and 362. Assistant Professors BOOTHROYD and ROBERTS.

An introductory course dealing with the nature, cause, and control of disease in plants. Some of the more common diseases of cultivated crops are studied in the laboratory.

2. *PRINCIPLES OF PLANT DISEASE CONTROL.* Fall or spring term. Preference to undergraduate students in fall and to graduate students in spring. Credit three hours. Prerequisite, course 200 or 1, or the equivalent. Lecture, time to be arranged. Plant Science 336. Laboratory, T Th 2–4:30. Plant Science 342. Professor L. J. TYLER and assistant.

A consideration of the principles and methods of controlling plant diseases. This includes studies on exclusion by laws, regulations, quarantine, inspection, and disinfection; eradication by pruning, seed selection, rotation, disinfection, and other means; protection by spraying, dusting, wound dressing, and the like; immunization by selection, breeding, and feeding. Number taking the course limited to twenty-four.

111. *PATHOLOGY OF SHADE TREES AND SHRUBS.* Spring term. Credit three hours. Given in alternate years. Prerequisite, course 1, 200, or permission

to register. Lecture, W 11. Laboratory, two periods to be arranged. Plant Science 362. Professor WELCH.

For students preparing for nursery or landscape work, park superintendents, arborists, city foresters or other horticultural professions; dealing with recognition, diagnosis and treatment of diseases of woody plants.

200. *GENERAL PLANT PATHOLOGY.* Fall term. Credit four hours. For graduate students with their majors or minors in plant pathology. Open also to qualified graduate students in other fields. Prerequisite, permission to register. Lecture, T 11. Plant Science 336. Laboratory, three periods weekly, two on T W Th or F 2–4 and one at the students' convenience. Plant Science 353. Assistant Professors BOOTHROYD and ROBERTS.

This course is designed to give the entering graduate student an introduction to the basic features and techniques of the science of phytopathology and to provide an adequate foundation for successful prosecution of research in this field.

201. *ADVANCED PLANT PATHOLOGY.* Fall and spring terms. Credit three hours each term. Designed for students specializing in plant pathology. Prerequisite, courses 2, 200, 121, or 221, and permission to register. Lecture, T 9. Plant Science 336. Laboratory, T Th 10–12:30. Plant Science 304. Professors KENT and ROSS.

A presentation and analysis of the experimental and empirical knowledge of plant diseases. The phenomena of inoculation, infection, susceptibility, and suscept reactions are critically considered. Major attention is given to the virus diseases and the nature of viruses.

[121. *COMPARATIVE MORPHOLOGY OF FUNGI.* Spring term. Credit four hours. Given in alternate years. Prerequisite, Botany 1 or its equivalent, and permission to register. Assistant Professor KORF.] Not given in 1954–55.

An introductory course in mycology. Emphasis is placed on morphology rather than on taxonomy.

221. *MYCOLOGY.* Fall and spring terms. Credit five hours each term. Given in alternate years. Prerequisite, Botany 1 or the equivalent and permission to register. Lectures, M W 11. Plant Science 336. Laboratory, M W 2–4:30, and one additional period to be arranged. Plant Science 326. Assistant Professor KORF.

A more intensive course than the preceding, designed especially for students specializing in mycology or plant pathology. Emphasis is placed on morphology and taxonomy, but other aspects of mycology are embraced. Practice in identification of specimens is afforded in various groups, and field work in fall and spring is encouraged.

222. *ADVANCED MYCOLOGY.* Fall or spring term, providing laboratory space is available. Credit from three to five hours. Prerequisite, course 121 or 221, and permission to register. Weekly conferences, laboratory periods, and occasional lectures, to be arranged. Plant Science 326. Assistant Professor KORF.

A special-problems course designed for students majoring or minoring in mycology or in mycological phases of plant pathology. The type of problem selected varies to suit the student's needs and inclinations. He is expected to gain an insight into research methods and the literature. The course offers an opportunity for intensive work on a restricted phase of the subject, such as physiology, morphology, or taxonomy.

244. *MYCOLOGY CONFERENCES.* Fall and spring terms. Credit one hour. Required of all majors and Ph.D. minors in mycology, but open to others by permission. Time to be arranged. Plant Science 422. Assistant Professor KORF.

A weekly discussion period designed to supplement the formal mycology courses by giving additional emphasis to problems in morphology, taxonomy, nomenclature, genetics, cytology, and physiology.

[231. *HISTORY OF PLANT PATHOLOGY.* Fall and spring terms. Credit one hour. Prerequisite, course 1 and a reading knowledge of French and German.] Not given in 1954–55.

241. *UNDERGRADUATE RESEARCH.* Fall or spring term, or both. Credit three hours or more. Registration by permission. Not less than three laboratory periods of three clock hours each week. Professors, Associate Professors, and Assistant Professors of the departmental staff.

This course is designed to afford opportunity for selected undergraduates to test their inclination and ability to do research work. The student is expected to prosecute with interest and enthusiasm, under informal direction of the professor, some problem or problems mutually agreed upon.

242. *SEMINAR.* Fall and spring terms. Required of graduate students taking work in the Department. T 4:30–6. Plant Science Seminar Room.

243. *LITERATURE REVIEW.* Fall and spring terms. Members of the staff and graduate students. Optional. Biweekly. Time to be arranged.

POMOLOGY

Students desiring to do their major work in pomology may obtain a suggested sequence of courses for the four-year period by consulting the Department.

GENERAL HORTICULTURE. (See Vegetable Crops 3.)

1. *GENERAL POMOLOGY.* Fall or spring term. Credit three hours. Should be preceded or accompanied by elementary courses in botany and chemistry. Lectures, T Th 8. Plant Science 233. Laboratory: fall term, T or W 2–4:30; spring term, M T W or Th 2–4:30. Plant Science 107. Spring term: Professor SMOCK; fall term: Associate Professor EDGERTON.

A study of the general principles and practices in pomology and their relation to the underlying sciences; propagation and care of orchard trees and small fruits; harvesting, storing, and marketing fruit; practical work in budding, grafting, pruning, and planting; study of varieties, growth, and fruiting habits.

102. *FRUIT VARIETIES.* Fall term. Credit three hours. Prerequisite, course 1. Lecture, T Th 12. Laboratory, S 8–10:30. Plant Science 114. Professor BOYNTON, Associate Professor SLATE, and Assistant Professor LAMB.

A systematic study of the most important varieties of apples, pears, peaches, plums, grapes, and small fruits from the standpoint of their identification, growth characters, and special cultural requirements. The development of new varieties by breeding and methods of testing and evaluating them are discussed. At least one field trip is given.

111. *HANDLING, STORAGE, AND UTILIZATION OF FRUIT.* Fall term. Credit three hours. Prerequisite, course 1. Lectures, T Th 8. Plant Science 143. Laboratory, Th or F 2–4:30. Plant Science 107. Professor SMOCK.

The important factors in handling fruit that affect quality and marketability, including the chemistry and physiology of fruits before and after harvest, are studied. The effect of grades and packages on distribution and marketing is fully discussed, with some attention to the problems of market inspection. Consideration is given to the principles and practices of common, cold, and controlled atmospheric storage, and to the utilization of fruits in the dried, canned, frozen, or juice forms. One Saturday field trip is required.

112. *ADVANCED LABORATORY COURSE.* Spring term. Credit two hours. S 8–1. Plant Science 107. Intended for students doing their major work in pomology. Professors HOFFMAN and BOYNTON and Associate Professor EDGERTON.

This course is designed to give more extended practice in the various orchard operations than can be given in course 1. Special attention is given to problems of pruning, grafting, orchard-soil selection and management, pollination, and spray practice. Several field trips extending into the afternoon are made.

[121. *ECONOMIC FRUITS OF THE WORLD.* Fall term. Credit three hours. Prerequisite, course 1. Given in alternate years. Professor BOYNTON.] Not given in 1954–55.

A study of all species of fruit-bearing plants of economic importance, such as the date, the banana, the citrus fruits, the nut-bearing trees, and the newly introduced fruits, with special reference to their cultural requirements in the United States and its insular possessions. All fruits not considered in other courses are considered here. The course is designed to give a broad view of world pomology and its relationship with the fruit industry of New York State.

131. *ADVANCED POMOLOGY.* Fall term. Credit three hours. Prerequisite, courses 1 and 102 and Botany 31. Lectures, M W F 9. Plant Science 141. Given in alternate years. Professor HOFFMAN or BOYNTON.

A comprehensive study of the sources of knowledge and opinions as to practices in pomology. The results of experiences and research pertaining to pomology are discussed, with special reference to their application in the solution of problems in commercial fruit growing.

[231. *SPECIAL TOPICS IN EXPERIMENTAL POMOLOGY.* Spring term. Credit three hours. Open to qualified seniors and to graduate students. Given in alternate years. Professors HOFFMAN, BOYNTON, and SMOCK and Associate Professor EDGERTON.] Not given in 1954–55.

In this course the student is expected to review critically and evaluate the more important original papers relating to various phases of pomological research. Recent experimental methods applicable to the topic are fully considered.

200. *SEMINAR.* Fall and spring terms. Without credit. Required of students taking course 201 and graduate students in pomology, T 11. Plant Science Seminar Room. Members of the departmental staff.

201. *RESEARCH.* Fall, spring, or both terms. Credit two or more hours a term. Prerequisite, course 131. Professors HEINICKE, HOFFMAN, SMOCK, and BOYNTON and Associate Professors EDGERTON and FISHER.

POULTRY HUSBANDRY

Four-year students interested in specializing in poultry husbandry may obtain two suggested sequences of courses by consulting the student advisers in the department. One is designed for students who intend to engage in some phase of poultry production or in a business allied with it, while the second is planned for students who are interested in preparing for a career in research or teaching in such specialized fields as poultry genetics, nutrition, or physiology.

Course 1 is a prerequisite for all other courses. Specially qualified students may have this prerequisite waived for some courses by permission of the instructors concerned.

1. *FARM POULTRY.* Fall term. Credit three hours. Lectures, M W F 10. One recitation period, to be arranged. Rice 300. Professor HALL, assisted by other members of the staff.

A general course dealing with the practical application of the principles of poultry husbandry to general farm conditions.

50. *MARKET EGGS AND POULTRY.* Spring term. Credit two hours. Prerequisite, course 1. Lecture, T 11. Laboratory, T W or Th 2–4. Rice 101. Professor HALL.

A detailed study of the interior and exterior qualities of eggs, abnormalities, egg grades, and standards; practice in candling, grading, and packing. Grades and standards of market poultry; killing, dressing, and packing. General market information. A one-day field trip is taken.

170. *POULTRY HYGIENE AND DISEASE.* Fall term. Credit two hours. Prerequisite, courses 30 and 110, Bacteriology 1 or 3, and Animal Physiology 10, or Human Physiology 303. Lecture and laboratory, Th 2–4:30. Moore Hall. Assistant Professor PECKHAM.

The course deals with the nature of the infectious and parasitic diseases of poultry and with the principles of hygiene applicable to poultry farming for the prevention and control of diseases.

190. *POULTRY PROBLEMS.* Fall or spring term. Credit, one, two, or three hours. Open to juniors or seniors. Prerequisite, written permission of staff member concerned. Investigation of some problem in the field of poultry husbandry by the student under the direction of a member of the staff. Professor BRUCKNER.

209. *SEMINAR IN POULTRY BIOLOGY.* Fall and spring terms. For graduate students. F 4:15. Rice 201. Members of the departmental staff.

A survey of recent literature and research in poultry biology.

GENETICS AND ANATOMY

20. *POULTRY BREEDS, BREEDING, AND JUDGING.* Fall term. Credit three hours. Prerequisite, course 1. Lecture or recitation, T Th 10. Rice 101. Laboratory, T or W 2–4. Judging Laboratory. Professor HALL.

Selecting and judging birds for production and breed characters; origin, history, and classification of breeds; introduction to breeding.

[120. *POULTRY GENETICS.* Spring term. Credit three hours. Open to graduate students, seniors, and juniors. Prerequisite, Zoology 104, Plant Breeding 101, or their equivalents and permission of the instructor. Given in alternate years. Professor HUTT.] Not given in 1954–55.

A survey of inherited characters in domestic birds, cytology, linkage, inbreeding, hybrid vigor, resistance to disease, genetic principles in poultry breeding, physiology of avian reproduction, infertility, embryonic mortality, and avian endocrinology.

124. *ANIMAL GENETICS.* Spring term. Credit three hours. For Veterinary students. Lectures, T Th 9. Rice 300. Laboratory and discussion, W 2. Rice 201 and 305. Professor COLE.

Principles of genetics; sex determination and sex linkage; inherited characters in domestic animals, with special reference to lethal genes and genetic resistance to disease; progeny-testing; inbreeding and cross-breeding.

[140. *ANATOMY OF THE FOWL.* Fall term. Credit three hours. Open to juniors, seniors, and graduate students. Prerequisite, course 1 and permission of the instructor. Given in alternate years. Professor COLE.] Not given in 1954–55.

The lectures, supplemented by laboratory periods for study and dissection, are designed to acquaint the student with the anatomy of the fowl.

NUTRITION

110. *POULTRY NUTRITION.* Spring term. Credit three hours. Prerequisite, course 1. Not open to freshmen. Lectures, T Th 9. Rice 101. Laboratory, Th or F 2–4. Rice 305. Professor HEUSER.

The principles of poultry nutrition and their application to poultry feeding management.

210. *ADVANCED POULTRY NUTRITION.* Spring term. Credit two hours. For graduate students. Not given every year and not unless ten or more students apply for the course. Registration by appointment. Discussion and laboratory period, Th 2–4. Rice 201. Professor NORRIS and Professor SCOTT.

A presentation of one or more important fields of research in poultry nutrition, a critical consideration of the experimental methods used in conducting the investigations, and a discussion of further studies needed, including the planning of the experiments.

219. *SEMINAR IN ANIMAL NUTRITION.* Fall term. Credit one hour. Open to graduate students with major field of study in animal nutrition. Prerequisite, Animal Husbandry 110 or the equivalent. Registration by permission. T 4:30. Rice 201. Animal Nutrition staff.

A critical review of the literature and other topics of special interest to graduate students in animal nutrition.

INCUBATION AND EMBRYOLOGY

30. *INCUBATION AND BROODING.* Spring term. Credit three hours. Prerequisite, course 1. Not open to freshmen. Lectures, T Th 10. Laboratory, M or T 2–4. Rice 201. Assistant Professor KING.

Principles of incubation and brooding of domestic and game birds; problems of hatchery management.

[230. *PHYSIOLOGY OF THE AVIAN EMBRYO.* Spring term. Credit two hours. For graduate students. Given in alternate years. Professor ROMANOFF.] Not given in 1954–55.

A consideration of biological potentialities of the fresh egg and of fundamental principles of embryonic development, with special emphasis on various factors leading to congenital malformation and prenatal death.

239. *SPECIAL TOPICS IN CHEMICAL EMBRYOLOGY.* Fall term. Credit one hour. Registration by permission. Rice Hall. Professor ROMANOFF.

A critical review of current literature.

RURAL EDUCATION

PROGRAM FOR THE PREPARATION OF SECONDARY-SCHOOL TEACHERS*

With careful planning it is possible to meet the requirements for a Bachelor of Science degree in Agriculture and, at the same time, the certification requirements for teaching. Therefore, students who desire to prepare for teaching science or vocational agriculture should plan their freshman and sophomore programs, with the appropriate adviser, in nature study and science teaching or vocational agriculture.

Those planning to teach science begin their professional studies in the junior year by taking courses in Educational Psychology (Rural Education 111), Human Development 201 and 202, and Social Foundations (Rural Education 190) and complete the required courses in methods and practice teaching by registering for Education 130 and Rural Education 128 and 129 in their senior year.

Students planning to teach vocational agriculture should register for Human Development 201 and 202 and Rural Education 131 in their junior year, and for Rural Education 111, 132, and 134 in their senior years. These courses are given by members of the staff at off-campus training centers while the students are doing practice

*For other courses in education, consult the Announcements of the Schools of Education and of Industrial and Labor Relations and of the Colleges of Home Economics and Arts and Sciences.

teaching in rural high schools. Certification may then be completed by registering for Rural Education 190 during the other semester of the senior year.

NATURE STUDY, SCIENCE, AND CONSERVATION EDUCATION

[106. *OUTDOOR LIVING AND CAMP ADMINISTRATION.* Fall term. Credit three hours. Registration by permission of instructors only. Assistant Professor FISCHER and Doctor NOAKES.] Not given in 1954–55.

107. *THE TEACHING OF NATURE STUDY AND ELEMENTARY SCHOOL SCIENCE.* Spring term. Credit two hours. Open to juniors, seniors, and graduate students, particularly those who are preparing to teach or supervise nature study or science. Lecture, S 8. Practical exercises, S 9–11:30. Stone 7. Associate Professor GORDON.

The content and methods of nature study and of elementary-school science, with field work and laboratory experience useful in classroom and camp.

108. *FIELD NATURAL HISTORY.* Fall or spring term. Credit two hours a term. Open to juniors, seniors, and graduate students, and to sophomores with permission of instructors. Lecture, T or F 4:30. Stone 7. Field work, T 2–4:30, primarily for undergraduates; F 2–4:30, primarily for graduates. Assistant Professor FISCHER.

Field trips and lectures devoted to a study of the natural history of several ecological units under different seasonal conditions, with special emphasis on the teaching of science and conservation. May be taken one or both terms.

128. *METHODS OF TEACHING SCIENCE IN SECONDARY SCHOOLS.* Spring term. Credit three hours. Prerequisite, Educational Psychology 111 or the equivalent. For advanced juniors and seniors. Th 2–5:30 and hours for observation to be arranged. Stone 7. Professor JOHNSON.

A consideration of methods and materials useful in teaching science in secondary schools. Observation of the work of experienced teachers constitutes an important part of the course.

129. *PRACTICE IN TEACHING SCIENCE IN SECONDARY SCHOOLS.* Fall or spring term. Credit four hours. Prerequisite, course 128 or 207 and permission of the instructor. For seniors and graduate students. Hours to be arranged. Professor JOHNSON.

Supervised practice in teaching science in secondary schools, with frequent conferences on teaching plans and problems.

202. *NATURE LITERATURE.* Fall term. Credit two hours. Given in alternate years. Open to seniors and graduate students interested in science and science teaching. Lectures, T Th 10. Stone 7. Associate Professor GORDON.

A survey of nature and science prose and poetry, with attention to their significance at elementary and secondary school levels, and for leisure reading.

[203. *RESEARCH AND WRITING IN NATURE AND CONSERVATION EDUCATION.* Spring term. Credit two hours. Given in alternate years. Professor ———.] Not given in 1954–55.

205. *THE TEACHING OF CONSERVATION.* Spring term. Credit two hours. T Th 10. Stone 7. Assistant Professor FISCHER.

Consideration of the principles, materials, and methods of conservation education useful to teachers and others engaged in teaching wise use of the resources of the nation.

207. *METHODS AND MATERIALS FOR THE TEACHING OF SCIENCE IN SECONDARY SCHOOLS.* Fall term. Credit two hours. Registration by permission only. For graduates. Th 4–5:30. Stone 7. Professor JOHNSON.

A consideration of problems of selection and organization of subject matter, of choice and use of materials, and of methods of teaching earth science at the secondary-school level.

[209. *THE DEVELOPMENT OF NATURE AND SCIENCE EDUCATION IN THE UNITED STATES.* Fall term. Credit two hours. Given in alternate years. Associate Professor GORDON.] Not given in 1954–55.

226. *RESEARCH IN NATURE STUDY, SCIENCE, AND CONSERVATION EDUCATION.* Fall or spring term. Credit one hour a term. F 12. Stone 7. Assistant Professor FISCHER, Associate Professor GORDON, and Professor JOHNSON.

A seminar dealing with special problems.

EDUCATIONAL PSYCHOLOGY

10. *PSYCHOLOGY.* Fall or spring term. Credit three hours. Recommended for freshmen and sophomores only. May not be taken for credit by students who have had Psychology 101 or the equivalent. M W 10 and one hour to be arranged. Plant Science 233. Assistant Professor AHMANN.

Designed for students who are not preparing to teach. Should not be taken by students planning to take course 111. Consideration of the outstanding psychological concepts that bear upon personal problems and upon business and social relationships.

111. *EDUCATIONAL PSYCHOLOGY.* Fall or spring term. Credit three hours. Prerequisite, Human Development. Not open to freshmen. Lectures, M W F 9. Fall term, Comstock 245; spring term, Comstock 145. Professor GLOCK.

Consideration of the outstanding facts and principles of psychology bearing upon the problems of education.

117. *PSYCHOLOGY OF ADOLESCENCE.* Spring term. Credit three hours. Prerequisite, a course in elementary or educational psychology. M W F 11. Caldwell 100. Associate Professor ELLIOTT.

A study of behavior during adolescence, of tasks involved in developing maturity and of the effects on development of some social conditions.

211. *EDUCATIONAL PSYCHOLOGY.* Fall term. Credit three hours. For mature students with teaching experience. Permission of the instructor required. M F 11–12:30. Stone 201. Professor GLOCK.

Special emphasis is given to the topics of learning, adjustment, and evaluation, and their relationship to the teacher's problems.

[213. *SEMINAR IN EDUCATIONAL PSYCHOLOGY.* Spring term. Credit two hours. Alternates with course 251. Assistant Professor AHMANN.] Not given in 1954–55.

[218. *SEMINAR IN EDUCATIONAL PSYCHOLOGY.* Spring term. Credit two hours. Prerequisite, permission of the instructor. Given every third year. Professor GLOCK.] Not given in 1954–55.

251. *EDUCATIONAL MEASUREMENT.* Spring term. Credit three hours. Candidates for a principal's certificate may register for two hours. Alternates with course 213. T Th S 10. Warren 345. Assistant Professor AHMANN.

A study of the construction of achievement tests and the use of aptitude tests, achievement tests, and other measuring instruments in the classification and guidance of pupils and improvement of instruction.

253. *INTRODUCTION TO EDUCATIONAL STATISTICS.* Fall term. Credit three hours. T Th 9–10:15. Warren 345. Assistant Professor AHMANN.

A study of common statistical procedures encountered in educational literature

and research. The course includes the computation and interpretation of descriptive measures and tests of significance.

254. *STATISTICAL INSTRUMENTS IN EDUCATION.* Spring term. Credit two hours. Prerequisite, course 253 or permission of the instructor. T Th 9. Warren 345. Assistant Professor AHMANN.

A study of the analysis of variance, the analysis of covariance, the discriminant function, test item analysis, and supporting topics.

255. *USE AND INTERPRETATION OF TESTS IN GUIDANCE AND PERSONNEL ADMINISTRATION.* Fall term. Credit two hours. Open to students in guidance or personnel administration and to classroom teachers who expect to work with standardized objective tests. Th 4–6. Stone 201. Assistant Professor ANDRUS.

This course deals with the development, use, and interpretation of aptitude tests as a basis for guidance and selection.

[315. *READING IN THE SECONDARY SCHOOL.* Spring term. Credit two hours. Given every third year. Professor GLOCK.] Not given in 1954–55.

316. *READING CLINIC.* Spring term. Credit two hours. Given every third year. M 4–5:30. Stone 201. Professor GLOCK.

EXTENSION, ADULT, AND HIGHER EDUCATION

214. *COLLEGE TEACHING.* Fall term. Credit two hours. M 7–9 p.m. Warren 145. Professor WINSOR and others.

Designed for those who plan to teach in higher institutions. Methods of teaching, organization of subject matter, motivation, learning, testing, grading and similar problems are treated.

223. *SEMINAR IN EXTENSION EDUCATION.* Throughout the year. Credit two hours each term. Open to graduate students in Extension Education and others interested in extension education. W 2–3:30. Warren 260. Professor LEAGANS.

Provides opportunity for special study of individual problems, for group study of common problems and for exchange of experiences among workers from various states and countries.

224. *PROGRAM BUILDING IN EXTENSION EDUCATION.* Fall term. Credit two hours. For graduate students in Extension Education and others interested in adult education. T 2–3:30. Warren 160. Professor LEAGANS.

A study of the basic problems, principles, and procedures in the process of extension program building in both agriculture and homemaking.

225. *TEACHING IN EXTENSION EDUCATION.* Spring term. Credit two hours. For graduate students in Extension Education and others concerned with teaching adults. T 2–3:30. Warren 260. Professor LEAGANS.

The course deals with the principles of teaching and learning and their application in extension teaching. Major problems, including the formulation of learning situations, selection, and organization of learning experiences, selection and use of extension methods and evaluation of teaching, are considered.

291. *SEMINAR IN THE DEVELOPMENT AND EXECUTION OF EDUCATIONAL PROGRAMS IN UNDERDEVELOPED AREAS OR COMMUNITIES.* Fall term. Credit two hours. Th 2–3:30. Stone 201. Professor LEAGANS.

Designed for teachers, extension workers, missionaries, government workers, and others who expect to do educational work in underdeveloped areas of the free world. Analysis is made of the cultural, social, educational, and economic factors in selected areas as background for forming program development and teaching procedures.

[293. *ADMINISTRATION AND SUPERVISION OF ADULT EDUCATION.* Credit three hours. Professor HOSKINS.] Not given in 1954–55.

294. *PRINCIPLES AND PHILOSOPHY OF ADULT EDUCATION.** Spring term. Credit two or three hours. F 4:15–6:00. Stone 201. Open to undergraduates by permission only. Professor HOSKINS.

The course is designed for directors of adult education and for teachers, extension agents, and other leaders of adult education. Emphasis is placed upon the basic philosophies of adult leaders in the United States and other countries and the principles upon which successful programs and special offerings have been organized and maintained.

[298. *RURAL EDUCATIONAL LEADERSHIP.* Spring term. Credit two hours. For graduate students and advanced undergraduate students. Especially appropriate for public school teachers, school principals, social workers, agriculture and home economics workers, and directors of adult education. Professor LEAGANS.] Not given in 1954–55.

[401. *PROBLEMS IN HIGHER EDUCATION.* Spring term. Professor STUTZ.] Not given in 1954–55.

Courses that offer additional basic work in the field of Extension Education are:

Rural Education 211, 219, 243, 244, 296, 299.
Home Economics 348, 361, 415, 430, 437, 440, 459.
Rural Sociology 105, 132, 212, 218.
Agricultural Economics 102, 140, 181, 236, 251.

Extensive flexibility is permitted students in the selection of a course program to meet his special interests and professional needs.

AGRICULTURAL EDUCATION

131. *INTRODUCTION TO TEACHING VOCATIONAL AGRICULTURE.* Spring term. Credit one hour (part of the ten-hour unit). Required of juniors and others entering the directed teaching program in the senior or following year. M 2–4:30. Warren 201. Staff in Agricultural Education.

A seminar type of course, with observations in near-by departments of agriculture, in orientation, preparation and selection of the trainee for directed teaching in off-campus cooperating school centers.

132. *METHODS, MATERIALS, AND DIRECTED PRACTICE IN VOCATIONAL AGRICULTURE IN THE SECONDARY SCHOOL.* Fall term. Credit nine hours. Staff in Agricultural Education.

Directed participation in off-campus centers in the specific and related problems of teaching prevocational and vocational agriculture on the junior and senior high school levels, to include adjustment in the school and community; evaluation of area resources, materials of instruction and school facilities; organization and development of local courses of study; launching and directing supervised farming programs; planning for and teaching all-day classes; advising Future Farmer chapters; and other problems relating to development of a balanced program for Vocational Education in Agriculture in a local area.

133. *SPECIAL PROBLEMS IN VOCATIONAL AGRICULTURE.* Spring term. Credit as arranged. Staff in Agricultural Education.

Selected problems in Vocational Agriculture to meet particular needs of prospective teachers.

134. *THE ORGANIZATION AND DIRECTION OF YOUNG FARMER*

*Given in alternate years as H.E. Ed. 437 and R.E. 294.

GROUPS. Fall term. Credit three hours. Professor HOSKINS and staff in Agricultural Education.

Directed participation in off-campus centers in problems of serving the needs of young men on farms to include their location and organization in local areas; the planning of local programs; the evaluation of their qualifications and opportunities for placement and progressive establishment in farming or in the related-farm occupations; and their cooperative relationships with, and the training for leadership in, other youth and adult organizations.

230. *SEMINAR IN AGRICULTURAL EDUCATION.* Spring term. Without credit. Required of seniors, and of adult special and graduate students in agricultural education. T 7–9 p.m. Stone 201. Staff in Agricultural Education.

[231. *SUPERVISION IN VOCATIONAL AGRICULTURE.* Fall term. Credit two hours. Professor W. A. SMITH.] Not given in 1954–55.

232. *METHODS OF INSTRUCTION IN VOCATIONAL AGRICULTURE.* Fall term. Credit two hours. Open to students with experience in teaching vocational agriculture. S 9–11. Stone 212. Assistant Professor KUNSELA.

Consideration is given to the selection of units of instruction, developing specific teaching objectives, analysis of farming problems, selection of teacher-pupil activities, and the evaluation of learning experiences as applied to individual and group instruction.

233. *SUPERVISED FARMING PROGRAMS IN VOCATIONAL AGRICULTURE.* Spring term. Credit two hours. T 4:15–6 p.m. Stone 201. Professor W. A. SMITH.

Meaning and function of farming programs; how they are planned and used as a means of instruction in vocational agriculture.

234. *EDUCATION FOR LEADERSHIP OF FARM YOUTH AND ADULT GROUPS.* Fall term. Credit two or three hours. F 4:15–6. Stone 201. Professor HOSKINS.

Designed for leaders in the fields of agricultural education who are responsible for organizing programs. A consideration of the objectives and trends in part-time education and in social-economic problems in rural areas.

235. *THE PREPARATION OF TEACHERS IN VOCATIONAL AGRICULTURE.* Fall term. Credit two or three hours. Open to students with experience in teaching vocational agriculture or by permission. M 4:15–6. Stone 201. Professor W. A. SMITH.

[236. *THE ORGANIZATION AND ADMINISTRATION OF VOCATIONAL AGRICULTURE IN THE SECONDARY SCHOOL.* Spring term. Credit two or three hours. Professor HOSKINS.] Not given in 1954–55.

237. *PLANNING COURSES OF STUDY AND PROGRAMS OF WORK FOR VOCATIONAL EDUCATION IN AGRICULTURE.* Spring term. Credit three hours. Registration by permission. Th 4:15–6 and one hour by appointment. Special trips to be arranged. Warren 201. Doctor NOAKES.

The development of basic and individualized courses of study and comprehensive programs of work. An evaluation of the effectiveness of vocational education in agriculture in selected high-school departments to determine patterns for course building and program planning.

238. *MATERIALS OF INSTRUCTION IN VOCATIONAL AGRICULTURE.* Fall term. Credit two hours. Open to students with experience in teaching vocational agriculture. M 7–9 p.m. Stone 201. Doctor NOAKES.

Consideration is given to the selection, preparation, adaptation, organization, and evaluation of instructional materials appropriate for use in teaching vocational agriculture.

239. *PREVOCATIONAL AGRICULTURE IN THE SECONDARY SCHOOL.* Spring term. Credit two hours. W 4–6 p.m. Stone 201. Assistant Professor KUNSELA.

Consideration is given to curriculum problems dealing with exploratory prevocational instruction and to the responsibilities of agricultural teachers for general education.

ADMINISTRATION AND SUPERVISION

219. *SEMINAR IN PERSONNEL ADMINISTRATION IN EDUCATIONAL INSTITUTIONS.* Spring term. Credit two hours. For graduate students in education. Th 4–6. Stone 201. Professor WINSOR.

Personnel management in relation to school administration.

243. *PROCEDURE AND TECHNIQUES IN SUPERVISION.* Fall term. Credit three hours. Candidates for a principal's certificate may register for two hours' credit. M W F 10. Stone. Professor ———.

Designed for superintendents, supervisors, and principals. Students taking this course must be prepared to spend four full days or more in observing supervisory procedures in various school systems.

[245. *SEMINAR FOR PRINCIPALS.* Fall term. Credit two hours. Required of all graduate students who are candidates for a principal's certificate. Professor ———.] Not given in 1954–55.

261. *FUNDAMENTALS OF EDUCATIONAL ADMINISTRATION.* Fall term. Credit three hours. T Th 11–12:30. Stone 212. Associate Professor ELLIOTT.

An introduction to the study of administration, with special application to the educational program. Both the science and the art of administration are examined.

262. *THE SECONDARY-SCHOOL PRINCIPALSHIP.* Fall term. Credit two hours. T 4:15–5:45. Stone 201. Associate Professor ELLIOTT.

A course in school administration dealing with the responsibilities of the secondary-school principal within the school building. Special attention is given to the problems of the small high school.

264. *SCHOOL FINANCE.* Fall term. Credit two hours. Prerequisite, course 261 or the equivalent. Th 4:15–5:45. Warren 201. Associate Professor ELLIOTT.

Typical problems: how local school funds are levied, collected, and disbursed; budget making; bonding; sources of state funds and their distribution.

[265. *THE SCHOOL PLANT.* Spring term. Credit two hours. Prerequisite, course 261 or the equivalent. Professor ———.] Not given in 1954–55.

[267. *LEGAL PROBLEMS OF THE SCHOOL ADMINISTRATOR.* Credit two hours. Mr. ———.] Not given in 1954–55.

[268. *SEMINAR IN EDUCATIONAL ADMINISTRATION.* Spring term. Credit two hours. Associate Professor ELLIOTT.] Not given in 1954–55.

CURRICULUM, ELEMENTARY, AND SECONDARY EDUCATION

[246. *THE SUPERVISION OF THE ELEMENTARY SCHOOL.* Spring term. Credit three hours. Candidates for a principal's certificate may register for two hours' credit. Professor ———.] Not given in 1954–55.

247. *SEMINAR IN ELEMENTARY EDUCATION.* Spring term. Credit two hours. S 9–10:40. Stone 201. Professor ———.

[263. *THE PRINCIPALSHIP OF THE ELEMENTARY SCHOOL.* Credit two hours. Professor ———.] Not given in 1954–55.

276. *PRINCIPLES OF CURRICULUM BUILDING.* Fall term. Credit two hours. W 4–6. Stone 201. Associate Professor STUTZ.

A consideration of major problems, principles, and techniques in determining the school curriculum.

277. *SEMINAR IN CURRICULUM.* Spring term. Credit two hours. Prerequisite, course 276 or the equivalent. W 2–3:30. Stone 201. Associate Professor STUTZ.

292. *SEMINAR IN SOCIAL STUDIES EDUCATION.* Fall term. Credit as arranged. M 4:15. Stone 212. Associate Professor STUTZ.

A course designed for resident or extramural students who are working on special problems in social studies education.

GUIDANCE AND PERSONNEL

282. *EDUCATIONAL AND VOCATIONAL GUIDANCE.* Fall term. Credit two hours. For graduate students only. S 9–11. Stone 201. Associate Professor A. G. NELSON.

Principles and practices of educational and vocational guidance. Historical and theoretical background of the guidance movement; educational, vocational, and community information needed; the study of the individual group; group methods; counseling; placement and follow-up; the organization, administration, and appraisal of guidance programs.

283. *COUNSELING METHODS.* Spring term. Credit two hours. For graduate students only. Prerequisite, course 255 and 282 or their equivalent. T 2–4. Warren 201. Associate Professor A. G. NELSON.

Techniques for counseling with individuals concerning various types of educational, social, and vocational adjustment problems. Case studies.

284. *GROUP TECHNIQUES IN GUIDANCE.* Spring term. Credit two hours. S 9–11. Warren 260. Associate Professor A. G. NELSON.

Methods and materials for presenting occupational and orientation information to students. Deals with classes in occupations, orientation groups, field trips, clubs, work-experience programs, and other group methods.

285. *OCCUPATIONAL AND EDUCATIONAL INFORMATION.* Fall term. Credit four hours. T Th 1. Field trips, M afternoon. Stone 201. Permission of the instructor required. Associate Professor A. G. NELSON.

Survey and appraisal of occupations and training opportunities; study of sources of educational and vocational information; job analysis; vocational trends. Field trips to places of employment.

289. *SUPERVISED PRACTICE IN TESTING AND COUNSELING.* Either term. Credit to be arranged. For advanced students only. Prerequisites, courses 255, 282, and 283, or their equivalents, and permission of the instructor. Hours for observation and practice to be arranged. W 5. Associate Professor A. G. NELSON.

Practice in the administration, scoring, and interpretation of psychological tests. Observation and supervised experience in counseling at the Cornell Guidance Center. Case conferences and assigned readings.

GENERAL EDUCATION

190. *SOCIAL FOUNDATION OF EDUCATION.* Fall or spring term. Credit three hours. Must be approved by the instructor in charge. Fall term: M W F 10; spring term: M W F 11. Warren 260. Associate Professor STUTZ.

Evaluation of the school as a social institution and emphasis upon the role the school must play in a democratic society.

[194. *PRINCIPLES OF VOCATIONAL EDUCATION.* Spring term. Credit two hours. Given in alternate years. Associate Professor W. A. SMITH.] Not given in 1954–55.

199. *INFORMAL STUDY IN EDUCATION.* Maximum credit, three hours each term. Members of the staff.

This privilege is granted to a qualified student of junior rank or above, when approved by his adviser from the Education staff who is personally responsible for the study.

297. *HISTORY OF EDUCATION IN THE MODERN PERIOD.* Spring term. Credit three hours. For seniors and graduate students. T Th 9–10:30. Stone 201. Associate Professor STUTZ.

A survey of education from the beginning of the seventeenth century to the present, with emphasis on public education and on historical trends affecting contemporary educational policies and practices.

299. *EDUCATIONAL RESEARCH METHODS.* Fall term. Credit two hours. For graduate students preparing for or engaged in research in education. M W 11. Warren 345. Assistant Professor AHMANN.

Consideration of the basic research methods as applied to education and the principles of thesis writing.

300. *SPECIAL STUDIES.* Credit as arranged. Members of the staff.

Students working on thesis or other research projects may register for this course. The staff members concerned must be consulted before registration.

400. *INTERNSHIP IN EDUCATION.* Fall and spring terms. Credit from two to six hours, as arranged. Members of the staff.

Opportunity for apprentice or similar practical experience on the graduate level in administration, agricultural education, guidance, personnel administration, supervision, and other types of professional service in education.

RURAL SOCIOLOGY

1. *GENERAL SOCIOLOGY FOR STUDENTS OF RURAL LIFE.* Fall or spring term. Credit three hours. May not be taken by those who have credit for Sociology and Anthropology 101. Not open to freshmen except in second term upon approval of the instructor. Lectures and discussions, M W F 8. Warren 45. Professor ANDERSON.

This is a general introductory sociology course designed especially for students in agriculture and home economics. Its object is to create an understanding of the group, the ecological, and the institutional organization of society and how they function. Illustrations are chiefly from rural society. The general social organization is described to show the interrelatedness of society.

12. *EFFECTIVE COMMUNITY LIVING.* Fall or spring term. Credit three hours. Open to sophomores, juniors, and seniors. M W F 11–12:20. Warren 131. Associate Professor REEDER.

This course is primarily concerned with helping students to acquire the kinds of understanding, skills, and attitudes that are essential in functioning effectively as members of a rural community. Students practice organization skills in the solution of laboratory problems. Principles are emphasized in relation to their application.

105. *ORGANIZATION METHODS.* Fall term. Credit three hours. Prerequisite, course 1 or 12 or permission of the instructor. T Th 11–12:50. Warren 31. Associate Professor REEDER.

A study of the methods and techniques by which officers, group members, and administrators may increase the effectiveness of organizations. Primary emphasis is given to organizations and service agencies which are found in rural society, such as farm bureau, home bureau, Grange, 4-H, churches, schools, fraternal organiza-

tions, and civic clubs. The course is designed to give students experience in using some of the basic organization methods.

111. *RURAL COMMUNITY ORGANIZATION.* Spring term. Credit three hours. Prerequisite, course 1 or 12 or permission of the instructor. M W F 9. Warren 232. Associate Professor REEDER.

A consideration of the problems involved in helping people and organizations in a community work together to meet their common needs.

Problems which arise in helping schools, churches, farm organizations, and civic groups in integrating themselves into the life of the community is one part of this consideration. Students are given the opportunity to practice some organization techniques which have been found successful in community organization work.

123. *PARTICIPATION IN SOCIAL AGENCIES.* Fall or spring term. Hours and credit to be arranged. Prerequisite, permission of the instructor. Preference in admission to this course will be given to students with experience in leisure-time agency programs (community centers, girl scouts, and the like.) Associate Professor TAIETZ.

This course is open to a limited number of mature students in the pre-professional social-work curriculum who are planning to take a beginning job in social work after graduation. A small number of opportunities are available for observation and limited participation in the practice of social casework in the following settings: medical, school, mental hygiene clinic, and the public welfare agency.

124. *THE FIELD OF SOCIAL WORK.* Fall term. Credit three hours. Not open to freshmen or sophomores. Prerequisite, one course in sociology and one course in psychology. Lectures and discussions, M W F 9. Warren 232. Associate Professor TAIETZ.

This course considers the field of social work and its services designed to meet a wide range of human needs growing out of social, economic, and emotional maladjustments. An understanding of social work is developed through a study of the processes of social case work, social group work, and community organization. Consideration is given to social work as a career, the professional knowledge and skill necessary for the practice of social work, and how these can be acquired through training.

126. *SOCIAL SERVICES TO INDIVIDUALS.* Spring term. Credit three hours. Prerequisite, course 124 or permission of instructor. M W 11–12:30. Warren 232. Associate Professor TAIETZ.

An analytical study of attitudes and behavior commonly encountered in helping people who have personal and social problems. A survey of social case-work methods, with particular emphasis on the technique of interviewing. Discussion of case material provided by the instructor and from student's own experience.

[128. *AN INTRODUCTION TO THE PUBLIC SOCIAL SERVICES.* Fall term. Credit three hours. Prerequisite, course 124 or permission of instructor. Associate Professor TAIETZ.] Not given in 1954–55.

The development of governmental responsibility for meeting economic need and social problems related thereto. An analysis of the basic concepts underlying the organization and administration of public social services.

[129. *PUBLIC SOCIAL SERVICES FOR CHILDREN.* Spring term. Credit three hours. Associate Professor TAIETZ.] Not given in 1954–55.

A study of the development of public responsibility for the care of dependent, neglected, delinquent, and handicapped children.

132. *RURAL LEADERSHIP.* Spring term. Credit two hours. Prerequisite, permission of the instructor. Th 2–4. Warren 31. Professor LARSON.

A study of the theories of leadership, a review of the significant research in the area of leadership, and a description and analysis of representative methods of recruiting and training lay leaders. Emphasis is on leadership in rural situations.

134. *RURAL SOCIAL PROBLEMS AND PUBLIC POLICY.* Fall term. Credit two hours. Open to graduate students. Prerequisite, permission of the instructor. T 2–4. Warren 31. Professor LARSON.

This course relates the problem concept to a theoretical frame of reference, traces the development of social problems in American rural life, and examines the social aspects of selected current problems including levels of living, socio-economic status groups, institutionalized facilities and services, population, and technological change. Public policies and action to meet these problems are described and analyzed.

[135. *FARMERS' ORGANIZATIONS.* Spring term. Credit three hours. Open to juniors, seniors, and graduate students. Professor ANDERSON.] Not given in 1954–55.

A study of the important farmers' movements in the United States. The organization, programs, and policies of present state and national farmers' organizations, and their relations to national agricultural policies and to extension programs.

137. *ADJUSTMENT IN THE MIDDLE AND LATER YEARS.* Fall term. Credit three hours. T Th 11–12:30. Warren 232. Associate Professor TAIETZ.

This course considers the adjustment in the middle and later years of life as a process of biological, psychological, and social change. Emphasis is placed upon changes in role and status, marital and family relationships, living arrangements, and employment. The provisions, public and private, that have been developed to meet the aged person's economic, social, psychological, medical, recreational, educational, and housing needs are described and evaluated.

[207. *SOCIOLOGICAL THEORY.* Fall term. Credit three hours. Alternates with course 208. Professor ANDERSON.] Not given in 1954–55.

A critical analysis of sociological theories from the time of Auguste Comte to contemporary sociologists.

[208. *SYSTEMATIC SOCIOLOGY.* Fall term. Credit three hours. Open to seniors and graduate students. Prerequisite, permission of instructor. Professor ANDERSON.] Not given in 1954–55.

This course presents a frame of reference for sociological thinking, with special emphasis on the interrelationships of the concepts in a system of sociology.

[211. *THE RURAL COMMUNITY.* Fall term. Credit two hours. Prerequisite, permission of the instructor. Associate Professor REEDER.] Not given in 1954–55.

The community is analyzed with regard to its structure and functions in present-day society. A developmental analysis is made of contemporary rural communities in America and other countries.

212. *RURAL SOCIOLOGY.* Fall term, credit three hours. M W F 9. Warren 31. Prerequisite, permission of the instructor or graduate standing. Professor LARSON.

A study of rural life in the United States, including population, patterns of making a living, group relationships, and the structure and functioning of institutionalized activities. These areas are considered from the standpoint of major trends and significant regional variations.

[213. *RURAL SOCIOLOGY.* Spring term in alternate years. Credit two hours. Prerequisite, course 212. Professor LARSON.] Not given in 1954–55.

A comprehensive review of the development and content of rural sociology and of the points of view represented in the field.

[217. *SEMINAR: THE HISTORY OF RESEARCH IN RURAL SOCIOLOGY.* Spring term. Credit three hours. Prerequisite, permission of the instructor. Professor ANDERSON.] Not given in 1954–55.

A study of the development of research in rural sociology. Analysis of research methods, objectives, and results.

218. *SEMINAR: APPLICATIONS OF SOCIOLOGY TO PROBLEMS OF RURAL SOCIETY.* Throughout the year. Credit two hours. Open to graduate students. M 2–4. Warren 232. Associate Professor MOE and members of the staff.

Application of sociological information, theory, and methods to the programs of institutions and agencies concerned with rural life. Special emphasis is placed on the problems of communication and social change.

219. *SEMINAR: COMMUNITY ORGANIZATION.* Spring term. Credit two hours. Prerequisite, permission of a department staff member. W 2–4. Warren 232. Professor POLSON and members of the staff.

Application of sociology to the problems of rural-community organization and community planning.

[220. *SEMINAR: COMPARATIVE RURAL SOCIAL LIFE.* Fall term. Credit two hours. Open to seniors, special students, and graduate students. Professor ANDERSON.] Not given in 1954–55.

A comparison of the ecological, economic, and social organization of rural life in foreign lands, including European, South American, Middle East, and Oriental countries, with consideration of major social problems. The specific countries to be studied are determined by student interest.

[240. *SEMINAR: PROBLEMS IN TEACHING SOCIOLOGY.* Spring term. Credit two hours. Prerequisite, permission of instructor. Associate Professor REEDER and staff.] Not given in 1954–55.

A consideration of the problems in teaching sociology in colleges and a study of some of the new approaches to teaching that are being tried in American universities.

250. *INFORMAL STUDY IN RURAL SOCIOLOGY.* Throughout the year. Credit to be arranged. Prerequisite, permission of the department staff member concerned. Professor POLSON and members of the staff.

251. *RESEARCH IN RURAL SOCIOLOGY.* Throughout the year. Hours and credit to be arranged. Professor POLSON and members of the staff.

METHODS OF RESEARCH IN THE BEHAVIORAL SCIENCES (ILR 497–498). An interdepartmental course given cooperatively by the staffs of the departments and schools interested in coordinated research training. Throughout the year. Credit three hours a term. First term prerequisite to the second. Open to upperclass majors and graduate students. T Th 10 and a two hour laboratory period to be arranged. Messrs. BRONFENBRENNER, DEAN, DEVEREUX, MOE, SUCHMAN, WILLIAMS, WHYTE and other members of the cooperating departments.

Basic scientific methods used in current research upon human behavior. Course will include survey method, unstructured interviewing, participant field observation, content analysis, controlled and semicontrolled experiments and the analysis of documents. Lectures, demonstrations, case materials, laboratory and field sessions.

VEGETABLE CROPS

Students planning to specialize to a greater or less extent in vegetable crops should consult the department regarding choice and sequence of courses. An outline of suggestions is available.

3. *GENERAL HORTICULTURE.* Spring term. Credit four hours. Lectures, M W F 8. Plant Science 233. Laboratory, M T W or F 2–4:30. East Roberts 301. Professor PRATT.

An introductory course in general horticulture, including flower, fruit, and vegetable growing. Intended primarily for students who want a general knowledge but do not plan to specialize in any one of these fields.

11. *COMMERCIAL VEGETABLE PRODUCTION.* Fall term. Credit four hours. Lectures, M W F 11. East Roberts 222. Laboratory W or F 2–4:30. East Roberts 301. Professor SWEET.

Intended for the student who wishes to specialize in commercial vegetable growing, whether the vegetables are for the fresh market or for processing. A study of the general principles of vegetable growing. Consideration is also given to the economic importance, cultural requirements, marketing, and storage of important vegetables. Field trips are required.

22. *POTATO PRODUCTION AND PROCESSING.* Spring term. Credit three hours. Lectures, T Th 10. East Roberts 222. Laboratory, T or W 2–4:30. East Roberts 223. Professor ORA SMITH.

General principles and practical phases of potato production, storage, and processing are discussed. Growth processes and soil and environmental factors are emphasized as influencing production. Topics such as storage methods, grading, packaging, cooking quality, nutritive value, processing, and industrial uses of potatoes also are studied. Two field trips, one of which is all-day, are taken to potato farms and processing plants.

10. *VEGETABLE JUDGING, GRADING AND IDENTIFICATION.* Fall term. Not for credit. M 4:30–6 or other time to be arranged if more suitable to group. East Roberts 223. Professor PRATT.

Intended to prepare students for participation in vegetable-judging contests, to help them become more competent vegetable judges at local and county fairs, and to enable them to teach this subject better when they are serving as teachers of vocational agriculture, local 4-H club leaders, or as county 4-H club agents. The best students in the class are selected as the *Cornell Vegetable Judging team* to compete in the national intercollegiate vegetable judging, grading, and identification contest in December.

The course includes potato grading, identifying potato grade defects, and identifying vegetable varieties, weeds, insects, and diseases, as well as judging vegetables.

12. *POST-HARVEST HANDLING OF VEGETABLE CROPS.* Fall term. Credit three hours. Lectures, T Th 11. East Roberts 222. Laboratory, T or W 2–4:30. East Roberts 223. Professor HARTMAN.

Horticultural aspects of marketing vegetables; vocational opportunities in the field; methods of estimating and measuring quality and grade; research results and practices in packing, storing, transporting, and selling. One two-day and three afternoon trips required. Estimated partial cost of transportation to be collected from the student, $2.

112. *HANDLING VEGETABLE CROPS, ADVANCED COURSE.* Fall term. Credit four hours. Primarily for graduate students and those undergraduates who are specializing in marketing. Lectures, T Th 11. East Roberts 222. Laboratory, T or W 2–4:30. East Roberts 223. One-hour conference period, to be arranged. Professor HARTMAN.

This course has the same lectures, laboratories, and field trips as course 12. Much more outside reading of research publications in the field is required in course 112 than in course 12, and different examinations are given for the two courses.

101. *VEGETABLE CROPS, ADVANCED COURSE.* Fall term. Credit four hours. Prerequisite, course 11 and Botany 31, Lectures, M W F 11. Laboratory, M 2–4:30. East Roberts 223. Professor JACOB.

A course devoted to a systematic study of the literature dealing with practices in vegetable production. Results of experiments that have been concluded or are being conducted are studied, and their application to the solution of practical problems is discussed.

113. *KINDS AND VARIETIES OF VEGETABLES.* Fall term. Credit three hours. Given in alternate years. Prerequisite, course 11 or permission to register. Lecture and Laboratory, F 2–4:30. Place to be announced. Associate Professor CAREW.

Laboratory work preceding the beginning of regular instruction is required, September 13 to September 21. Report at East Ithaca Gardens at 8 a.m., September 13. The instructor should be notified by September 3 of intention to register for this course.

This course involves a study of new and standard varieties of strains of vegetables, their origin, characteristics, adaptation, identification, and evaluation. The vegetable seed industry is also discussed. The main value of this course lies in the study of crops in the field.

[225. *RESEARCH METHODS IN VEGETABLE CROPS.* Spring term. Credit four hours. Primarily for graduate students. Prerequisite, course 101. It is recommended that Botany 231 and 232 precede or accompany this course. Associate Professor KELLY and Professor JACOB.] Not given in 1954–55.

A study of research techniques peculiar to vegetable crops, with a study of the literature and the solution of research problems.

231. *UNDERGRADUATE RESEARCH.* Fall and spring terms. Credit one or more hours a term, by arrangement. For advanced undergraduate students. Registration by permission of the staff member who is to direct the research. Members of the staff.

Special problems may be elected in any line of vegetable work. Summer residence is often necessary in connection with experimental problems.

232. *SEMINAR.* Fall and spring terms. Required of graduate students taking either a major or minor in this Department. Th 4:15. East Roberts 222. Members of departmental staff.

COURSES IN OTHER COLLEGES THAT MAY BE OFFERED TO MEET THE SPECIFIC REQUIREMENTS OF REGULAR STUDENTS IN THE COLLEGE OF AGRICULTURE

Reference should be made to the *Announcement of the College of Arts and Sciences,* or its supplements, for descriptions of English 111 and 112, Chemistry 101 and 102, or 105 and 106, Physics 103 and 104, Geology 115, and Zoology 103 and 104, which may be used to satisfy the requirements in those subjects, as listed on page 26.

MILITARY SCIENCE AND PHYSICAL TRAINING

The *Announcement of the Independent Divisions and Departments* lists the courses that meet the University's requirements in Military Science and Physical Training.

General Information

THE BUILDINGS

THE BUILDINGS erected under the enactment of 1904 were first occupied in June 1907. The central group then erected consisted of a main administrative and classroom building, Roberts Hall, connected by covered loggias with the Dairy Building, now East Roberts, on the east, and with Stone Hall, now occupied by the Department of Rural Education, on the west. Subsequently, the Legislature provided for the erection of two large barns, a greenhouse range, a forestry building (Fernow Hall), a poultry husbandry building (Rice Hall), a soils building (Caldwell Hall), an auditorium (Bailey Hall), a classroom building (Wing Hall) and a stock-judging building for animal husbandry, several small poultry buildings, a sheep barn, a swine barn, a farm shop and tool shed, and an insectary. There are, in addition, a fish-breeding house in Cascadilla Creek, a seed-storage house, a cold-storage and packing house, and other small buildings on the farms. In 1920 the State authorized the College to plan a further development of its building program involving an expenditure of $3,000,000. Under this building program plan $500,000 was appropriated in 1920 for a new dairy building, and in 1922 provision was made for its equipment. The building came into use in the fall of 1923. A further appropriation of similar amount was used for completing the Dairy Building, erecting an additional greenhouse range, moving and remodeling the Agricultural Engineering laboratories, and constructing the foundation for the Plant Science Building. The last-named building was completed under an appropriation of $1,100,000 made by the Legislature of 1928, and occupancy began with the second term of 1930–31. The Legislature of 1930 provided $400,000 for the equipment of the Plant Science Building and appropriated $100,000 for additional barns and other smaller buildings for the Department of Animal Husbandry. It also appropriated $100,000 for the construction of the foundation of a building for the Departments of Agricultural Economics and Rural Sociology, and to this sum the Legislature of 1931 added $500,000 for the completion of the building. The new barns for sheep, swine, and beef cattle were completed in 1931. The Departments of Agricultural Economics and Rural Sociology occupied their new building, Warren Hall, in February, 1933. In 1934–35 the completion of a new home economics building, Martha Van Rensselaer Hall, made it possible to move the Department of Entomology into the building previously occupied by the College of Home Economics. The building is now

named Comstock Hall. The horse barn and the sheep barn were destroyed by fire in 1938 and have subsequently been replaced. A new library for Agriculture and Home Economics was completed in 1952. Construction of a new building for Agricultural Engineering was started in the fall of 1953.

LANDS FOR RESEARCH AND INSTRUCTION

Cornell University owns or leases about 12,000 acres of land. Of this, approximately 7,500 acres are used by the several departments of the College of Agriculture. About 600 acres more are in wildlife preserves and field stations and are used jointly by several departments of the University.

The type and amount of land assigned to each department varies according to its needs. Some departments, such as Agronomy, Plant Breeding, Floriculture and Ornamental Horticulture, and Vegetable Crops, need tillable land with certain types of soil on which to conduct field experiments. The Animal Husbandry Department needs large areas suitable for pasture and for the production of hay and corn for silage to feed experimental animals. The Department of Pomology has an area of about 100 acres that is used for orchard and small fruits, and the Department of Poultry Husbandry uses about the same acreage for poultry buildings and range.

Arable land not immediately needed by the individual departments for research and instruction is operated by the Office of Farm Practice on an extensive basis. This office also acts as a service department, plowing and fitting much of the land used by other departments for experimental purposes. This system prevents the duplication of expensive machinery and uses the farm labor efficiently. The Departments of Animal Husbandry, Agronomy, and Plant Breeding, because they have such large areas under cultivation, own their own equipment.

The tillable lands used by departments of the College comprise about 2,200 acres; about 465 acres more are in pasture. The remaining area used by the College consists of forest tracts and of lands used as wildlife preserves and field stations. The Department of Conservation alone operates almost 5,000 acres, of which the Arnot Forest, about twenty miles southwest of Ithaca and consisting of more than 4,000 acres, and the Adirondack Forest of 624 acres are the most extensive. The wildlife preserves and field stations include a biology field station at the head of Cayuga Lake, wildlife reservations at McLean and Ringwood (each only a short distance from Ithaca), and a wildflower preserve at Slaterville.

LIBRARIES

The Colleges of Agriculture and Home Economics are served by the Albert R. Mann Library of about 210,000 volumes. This is supplement-

ed by the other libraries of Cornell University, containing more than 1,000,000 volumes, many of which also relate directly to agricultural and home economics subjects. In addition to materials on applied agriculture and home economics, the Mann Library contains extensive collections dealing with such related sciences as botany, biochemistry, bacteriology, genetics, and entomology. It also includes large collections in economics, sociology, and education, and smaller collections on a variety of other subjects. Of major importance are the numerous complete files of foreign and domestic periodicals and government publications, of which some 6,000 are received currently. The library includes an outstanding collection on beekeeping maintained from funds provided in honor of the late Everett Franklin Phillips.

The principal collection on entomology and limnology is in Comstock Hall, with the department it serves. Small departmental collections of reprints, bulletins, and duplicate books and journals for use of faculty and graduate students are also provided in several other buildings.

The Albert R. Mann Library, completed in 1952, has a capacity of 400,000 volumes and 600 reading room seats. The first floor is devoted primarily to books assigned for class reading, with rooms seating 300 persons. Also on this floor are rooms for typing and for small groups studying together, and the Ellis Room containing books and periodicals for informal reading. On the second floor are the reference, bibliography, and periodical reading rooms, offices, and work rooms, the main loan desk, and the card catalog. The catalog provides a record of the library materials in all libraries and departmental collections of the Colleges. The Library has a comprehensive collection of bibliographies, as well as a card catalog of publications of the United States Department of Agriculture.

The Library is open, with librarians on duty to assist readers, from 7:50 a.m. to 10:00 p.m. daily except Saturday, when it closes at 5:00 p.m. Students may borrow most books, except those on reserve, for periods of two weeks. Detailed information on library regulations and suggestions for use of the Library are provided in a handbook distributed to all new students.

SCHOLARSHIPS

GENERAL SCHOLARSHIPS

Students in the College of Agriculture are eligible to compete for certain scholarships that are available to all undergraduates in the University. Among these are the Cornell National Scholarships, the University Undergraduate Scholarships, and the George W. LeFevre Scholarships. Residents of New York State are also eligible for the State University Scholarships. Those who reside in certain areas may apply for

scholarships supported by the Cornell Alumni Clubs. Numerous other scholarships have various special limitations other than enrollment in a particular school or college of the University. A complete list and a description of all these scholarships are given in *Scholarships and Grants-in-Aid,* a booklet that may be obtained by prospective students from the Director of Admissions or from Official Publication, and by students in residence from the Dean of Women or Dean of Men, in Edmund Ezra Day Hall. Prospective students who desire to become candidates for any of these scholarships should get this booklet early in the final year of secondary school, to be certain that their applications are on file at the proper time and that they make the necessary arrangements to take the required tests.

Of special interest are the State University Scholarships mentioned above, five of which are awarded each county annually for each assembly district therein. Each of these scholarships entitles the holder to $350 for each year while he is attending an approved college in this State during a period of four years. At Cornell they are commonly known as the *State Cash Scholarships,* to distinguish them from the State Tuition Scholarships in this University. They are awarded by the State Commissioner of Education at Albany, to whom application should be made for any information about the conditions of award, or any information about the rules of administration.

SCHOLARSHIPS AWARDED BY THE COLLEGE OF AGRICULTURE

SEARS, ROEBUCK SCHOLARSHIPS

The Sears, Roebuck Agricultural Foundation has provided fifteen scholarships for farm-reared freshmen entering in 1954–55. The value of each scholarship is $200. The awards are made on the basis of financial need and of scholastic promise in the field of agriculture. A scholarship of $200 is available for an outstanding sophomore who held one of these scholarships in his freshman year. Applications are to be addressed to the Office of Resident Instruction, Roberts Hall, Ithaca, New York, and must be completed by July 15.

NEW YORK STATE BANKERS ASSOCIATION SCHOLARSHIP

A scholarship of $200 is offered for 1954–55 by the New York State Bankers Association to a young man who has been a 4-H Club member and who is recommended by his 4-H Club agent. It is awarded for the freshman year on the basis of financial need, scholarship, and the promise of service to agriculture. The 4-H Club agent in each county of New York State may recommend one candidate to whom he will forward an application form. Applications must be on file in the Office of Resident Instruction, Roberts Hall, Ithaca, New York, by July 15.

THE CARL E. LADD MEMORIAL SCHOLARSHIPS

A fund in memory of Carl E. Ladd, Dean of the College from 1932

until his death in 1943, provides scholarships with an annual value of $200 each. These scholarships are open to young men and women from New York farms who are members of any class in the College of Agriculture. The awards are made on the basis of financial need, promise for future leadership, and school record. Applications are to be sent to the Office of Resident Instruction, Roberts Hall, Ithaca, New York, by July 15. Seventeen scholarships are available for the academic year 1954–55.

GEORGE LAMONT EDUCATIONAL FUND

The George LaMont Educational Fund was established by gifts from George B. LaMont and his son T. E. LaMont, owners of the LaMont Fruit farm in Albion, Orleans County, New York. The income from the fund provides scholarships for Orleans County farm boys of good moral character who have a record in school and out that shows ability and application and who are in need of financial assistance. Awards are for one year and usually are made only to boys entering college.

One or two scholarships of $200 each are available for the academic year 1954–55.

Application blanks are distributed by the principals and teachers of vocational agriculture in Orleans County high schools. The completed application and the supporting form are to be addressed to the Office of Resident Instruction, Roberts Hall, Ithaca, New York. Both must be received by July 15.

THE ROBERTS SCHOLARSHIPS

The Roberts Scholarship Fund, a gift of the late Dr. Charles H. Roberts, of Oakes, Ulster County, New York, provides five scholarships, each retainable for one year, but not open to newly entering students. As expressed by the founder, the purpose of these scholarships is to furnish financial assistance to students in the College of Agriculture who are of good moral character, who show native ability, tact, and application, and who are in need of such assistance, especially students coming from rural districts. The awards are made after the close of each year. Application blanks and copies of the regulations may be obtained at the office of the Secretary of the College of Agriculture. All applications must be on the official blanks, which, with all other information, must be filed at the Office of Resident Instruction of the College by June 1. The present value of each scholarship is $250.

BORDEN AGRICULTURAL SCHOLARSHIP AWARD

The Borden Company has established an annual scholarship award to recognize and assist outstanding students who give promise of future achievement. It is awarded to the student of the College of Agriculture who has taken at least two courses in dairying and who, upon entering his senior year, has the highest average grade for all of his previous

college work of any of the similarly eligible students. The value is $300 payable upon registration in the College for the senior year.

THE BURPEE AWARD IN HORTICULTURE

An annual award of $100 is made possible through a grant from the W. Atlee Burpee Company, Seed Growers, Philadelphia, Pennsylvania, and Clinton, Iowa. The purpose of this award is to encourage outstanding students in the study of vegetable growing and flower growing. It is to be awarded at the beginning of the senior year and is to be divided equally between two students, one in the field of floriculture and ornamental horticulture and the other in vegetable crop production. To be eligible, the student shall have completed Botany 31 or its equivalent and at least two courses in the Department concerned, and shall have signified intention of specializing in that Department.

HERVEY S. HALL SCHOLARSHIP

The Hervey S. Hall Scholarship, established by bequest of Miss Mary F. Hall, of Spencer, New York, and having an annual value of $120, is to be awarded to a properly qualified student of either sex, a resident of New York, pursuing a course in agriculture leading to the degree of Bachelor of Science, and in need of financial aid. It is "to be granted first to a student from the town of Spencer, New York, should a suitable candidate appear, or to a student from Tioga County, or from the State at large." Application for this scholarship should be made at the Office of Resident Instruction by June 1.

THE ROBERT M. ADAMS 4-H MEMORIAL SCHOLARSHIP

The Robert M. Adams 4-H Memorial Scholarship was established in honor of Professor R. M. Adams by the 4-H Clubs of the State. The scholarship yields approximately $50 a year. Students who are New York residents are eligible to apply after their first year in the College, and those who have been 4-H Club members are given first consideration. The award is based on financial need, character, ability, and scholarship. Application for this scholarship should be made at the Office of Resident Instruction by June 1.

WOMAN'S NATIONAL FARM AND GARDEN ASSOCIATION SCHOLARSHIPS

The New York State Division of this Association has provided the following two scholarships:

A scholarship in honor of its first president, Mrs. Francis King. The value of the scholarship is $500, payable over a two-year period. The award is made biennially to a woman of the sophomore class in the College of Agriculture. Character, interest in agriculture, scholarship, and financial need are considered. Applications should be sent to the Office of Resident Instruction, Roberts Hall, Ithaca, New York, before June 1.

A scholarship in recognition of its honorary president, Mrs. Walter Douglas. Junior or senior women in the College of Agriculture who have achieved high standing are eligible to apply for the award of $200. Character and financial need are considered, with preference given to girls who have been active in a 4-H Club. Application should be made at the Office of Resident Instruction by June 1.

ESSO 4-H SCHOLARSHIP

The Esso Standard Oil Company has established four-year scholarships of $100 a year to be awarded, two each year, to students entering the College of Agriculture. The awards are made, on the basis of merit, ability, and need, to boys who have satisfactorily completed at least three years of 4-H Club work including the preceding year, and who graduate from high school with a scholastic standing in the upper half of the class. The recipient receives $100 each year for four years, provided he remains in college and maintains a satisfactory record.

Application blanks may be obtained from the 4-H Club agent in each county. Applications must be on file in the Office of Resident Instruction, Roberts Hall, Ithaca, New York, July 15.

WARD W. STEVENS HOLSTEIN SCHOLARSHIP

A fund in honor of Ward W. Stevens provides a scholarship to a male undergraduate student in either the two-year or the four-year course in the College of Agriculture, who has completed at least one-half of his course. The value of the scholarship in 1954–55 is $500. It may be awarded to one student or divided between two students. A student who has held the scholarship is eligible to reapply. The award is based on exceptional ability in the judging and handling of dairy cattle, high scholastic rank in dairy-husbandry courses, need of financial assistance, and special interest in the Holstein breed of cattle. Applications should be received in the Office of Resident Instruction, Roberts Hall, Ithaca, New York, by June 1.

BEATTY AGRICULTURAL SCHOLARSHIP

The Beatty Agricultural Scholarship fund, a gift of the late Harrison L. Beatty, provides a scholarship of approximately $200 to a student entering the College of Agriculture from the Town of Bainbridge or from Chenango County. Grades in Regents examinations receive major consideration in making the award. Application blanks may be obtained from principals in Chenango County schools and must be sent to the Office of Resident Instruction, Roberts Hall, Ithaca, New York, by July 15.

THE DAIRY MARKETING RESEARCH FUND SCHOLARSHIP

The Dairy Marketing Research Fund has established a scholarship with an annual value of $400. A candidate, to be eligible for an award, must have completed the work of the junior year and attained a cumu-

lative average in all of his courses of 78 or above. In addition, he must have passed at least one course in each of dairy industry, dairy marketing, and dairy husbandry or farm management, except that no more than one of the named courses may be included in the schedule for the senior year. Consideration is also given to financial need, character, personality, and potential qualifications for contributing to improved relationships and techniques in the marketing of milk or the manufacture of dairy products. Application for the scholarship should be made on official forms and filed with all supporting information in the Office of Resident Instruction by June 1.

NEW YORK STATE CANNERS AND FREEZERS ASSOCIATION, INCORPORATED, SCHOLARSHIP

An annual scholarship of $200 is provided by the New York State Canners and Freezers Association, Incorporated. It is awarded to a student who is a resident of New York State, has two years of credit toward graduation, and gives evidence of preparing for a career in the processing of fruits and vegetables. In making the selection, the Committee on Scholarships takes into consideration scholastic record, financial need, leadership ability, and other desirable qualifications. Applications should be filed in the Office of Resident Instruction by June 1.

THE HEATLEY GREEN SCHOLARSHIP

The Heatley Green Scholarship Endowment was established under the will of Mrs. Green in memory of her husband, who had been a New York State farm boy and was a graduate of the College of Engineering at Cornell in the class of 1901. Mr. Green had believed strongly in proper training for successful farming, and this scholarship is to be used to help and encourage worthy undergraduate students of moderate means. The value of the scholarship for 1954–55 is $800. Awards are made on an annual basis and may be to one student or divided between two or more students of any class in the College of Agriculture. Applications must be filed at the Office of Resident Instruction, Roberts Hall, Ithaca, New York, by July 15.

VAN DALE FARM MACHINES SCHOLARSHIP

An annual scholarship of $250 has been established by Van Dale Farm Machines, Inc., Wayzata, Minnesota, for the benefit of a freshman admitted to the College of Agriculture for the study of agricultural engineering. The award shall be based on interest in farm machinery, scholastic record, and demonstrated qualities of leadership as evidenced by participation in school and community affairs. Applications must be filed in the Office of Resident Instruction, Roberts Hall, Ithaca, New York, by July 15.

WALTER R. CLARKE MEMORIAL ENDOWMENT

The Walter R. Clarke Memorial Endowment in memory of Mr.

Clarke, a prominent fruit farmer who lived at Milton, New York, provides a scholarship of $100 each year for a student of any class in the College of Agriculture who is primarily interested in horticulture. Promise for successful work in this field is the basis for an award. Preference is given to students from the Hudson Valley area. Applications should be on file in the Office of Resident Instruction, Roberts Hall, Ithaca, New York, by July 15.

THE HUDSON H. LYON MEMORIAL SCHOLARSHIP

The endowment for this scholarship fund was established by the late H. H. Lyon of Bainbridge, New York. The income, amounting to about $1200 a year, is to be used to aid students who are preparing for Protestant Christian missionary service, with preference to those who include agriculture in their training. Applications should be filed at the Office of Resident Instruction, Roberts Hall, Ithaca, New York.

SCHOLARSHIPS FOR NONRESIDENTS

Fifteen tuition scholarships are available for nonresidents of the State. They are awarded annually, and evidence of need is required. Applications should be filed in the Office of Resident Instruction, Roberts Hall, Ithaca, New York, by July 15.

OTHER SCHOLARSHIPS

A description of other scholarships open under certain conditions to undergraduates in the College of Agriculture is found in the booklet *Scholarships and Grants-in-Aid.*

PRIZES

THE EASTMAN PRIZES FOR PUBLIC SPEAKING

With the object of developing qualities of personal leadership in rural affairs, Mr. A. R. Eastman of Waterville, New York, established annual prizes, the first of $100 and the second of $25, for public speaking on country-life subjects. These prizes are designated the Eastman Prizes for Public Speaking. Competition is open to any regular or special student in the College of Agriculture. The contest takes place usually during Farm and Home Week.

THE RICE DEBATE STAGE

To stimulate the study and public discussion of vital farm-life problems, the late James E. Rice, Professor of Poultry Husbandry, Emeritus, established annual prizes, the first of $100 and the second of $25. The contest is in the form of a debate. Preliminary trials are held in December, on a subject to be announced. The final competition is held usually in Farm and Home Week. All regular or special students are eligible.

THE PAUL H. GULDIN MEMORIAL ENDOWMENT

The Paul H. Guldin Memorial Endowment, established by Mrs. Paul H. Guldin as a memorial to her husband, a graduate of the College in 1912, is to encourage undergraduate students in the College of Agriculture to become interested, and to take part, in the development of a more adequate rural leadership. The income supports a contest in 1954–55 for the best original articles or stories, written by undergraduates in the College and published in the *Cornell Countryman,* that contribute to the purpose of the endowment. The contest includes all issues of the magazine for the academic year. Two first prizes of $50 each and four second prizes of $25 each are available. Award will be made, not later than June 1, 1955, by a committee from the Faculty, appointed by the Dean.

THE RING MEMORIAL PRIZES

A bequest of Mr. Charles A. Ring, of Niagara County, New York, has established prizes to be awarded to undergraduate students in agriculture who, in essays giving reviews of the literature on problems in floriculture, vegetable gardening, or pomology, show the greatest ability to evaluate scientific evidence. The prizes for 1954–55 include first, second, and third place awards of $40, $20, and $10 each. The contest is open to students who have taken or are taking courses in the horticultural departments. The essays must be submitted to the Secretary of the Faculty of Agriculture by noon on May 1.

THE CHARLES LATHROP PACK FOUNDATION FORESTRY PRIZE

The Charles Lathrop Pack Foundation Forestry Prize is in the amount of $40 and is awarded annually in April for the best essay on forestry submitted by a resident student who has taken some course in forestry during the current college year. The purpose of the prize is to aid in training men and women to write articles that will arouse in the public an interest in forestry and an appreciation of what forestry means to the country. The award is made by a committee appointed by the President of the University. The detailed regulations are furnished by the Department of Conservation or by the Secretary of the College. The essay must be deposited at the office at the head of the Department of Conservation by noon on April 15.

ALUMNI PRIZE

The Alumni Association of the College of Agriculture contributes an annual prize of $25 to be awarded at the close of the junior year to the student who has maintained the best scholastic record during his three years in the University, the award to be made by the Faculty of the College.

ALPHA ZETA CUP

The Alpha Zeta fraternity has presented a prize cup to be awarded for custody for one year to the male student in the College of Agriculture making the best scholastic record during the freshman year. For students first admitted in the second term, the average of three terms' work is considered. Presentation of the cup is made at the opening of the fall term.

OTHER PRIZES

Information concerning other prizes offered in the University and open to competition of students in the College of Agriculture is given in the special booklet called *Prize Competitions,* which may be obtained by writing to Cornell University Official Publication, Edmund Ezra Day Hall, Ithaca, New York.

LOANS

The New York State Grange has established a loan fund to aid its members in obtaining a higher education. Applications may be made to Mr. H. M. Stanley, Skaneateles, New York.

A fund contributed by students of the College is available for small, short-time, emergency loans. Application may be made to the College Secretary.

A fund, the interest on which is available for loans to students specializing in floriculture, has been established by Mr. Max Schling of New York City. Another loan fund for students of floriculture, with principal and interest available, has been contributed by the New York Florists Club. Applications for loans from both these funds may be made to the College Secretary.

Notice of other loan funds, available to students of all colleges in the University, is found in the booklet *Scholarships and Grants-in-Aid.*

HEALTH SERVICES AND MEDICAL CARE

These services are centered in the University Clinic or out-patient department and in the Cornell Infirmary or hospital. Students are entitled to unlimited visits at the Clinic; laboratory and X-ray examinations indicated for diagnosis and treatment; hospitalization in the infirmary with medical care for a maximum of fourteen days each term and emergency surgical care. The cost for these services is included in the College and University general fee. For further details, including charges for special services, see the *General Information Announcement.*

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